# THE CREATION OF GOD

JACOB HARTMANN

1893

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Title: The Creation of God

Author: Jacob Hartmann

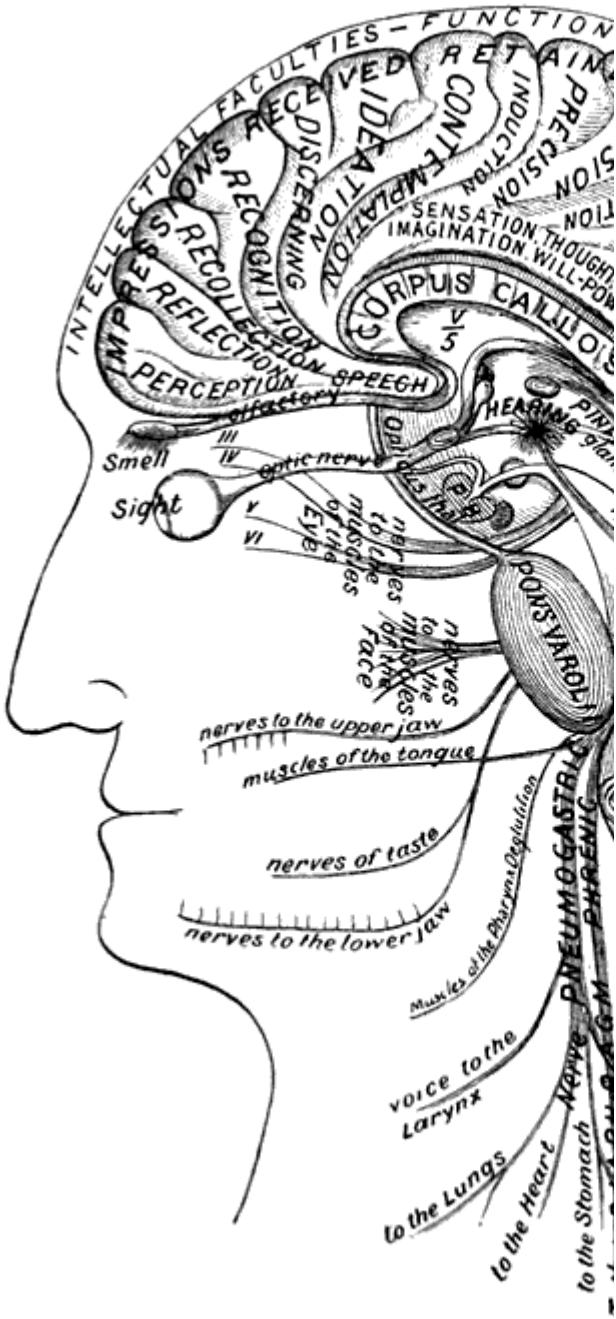
Release date: June 1, 2019 [eBook #59651]

Language: English

Other information and formats: www.gutenberg.org/ebooks/59651

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THE CREATION OF GOD ***


INTELLECTUAL FACULTIES – FUNCTION
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IDEATION
CONTEMPLATION
INDUCTION
PRECISION
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HEARING
PONS VAROLII
nerves to the muscles of the face
nerves to the upper jaw
muscles of the tongue
nerves of taste
nerves to the lower jaw
Muscles of the Pharynx Deglutition
voice to the Larynx
to the Lungs
to the Heart
Nerve
PNEUMOGASTRIC
to the Stomach



# THE CREATION OI

BY

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versity; M.B. Trinity College, Ontario; Member
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County Medical Society of
New York, etc., etc.

NEW YORK:
THE TRUTH SEEKER COMPAN
28 LAFAYETTE PLACE.

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New York:
THE TRUTH SEEKER COMPANY,
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# PREFACE.

“Si les nommes étaient capables de gouverner toute la conduite de leur vie par un dessein reglé, si la fortune leur était toujours favorable, leur âme serait libre de toute superstition.”

—*Spinoza*, 1650.

“Il n’y a pas de moyen plus efficace que la
Superstition pour gouverner la multitude.”

—*Quinte Curce.*

"But in the temple of their hireling
hearts
Gold is a living god, and rules in scorn
All earthly things but virtue."

"Falsehood demands but gold to pay
the pangs
Of outraged conscience; for the slavish
priest
Sets no great value on his hireling
faith."

"But human
pride
Is skillful to invent most serious names
To hide its ignorance."

—*Shelley.*

At this time, in this age of agitation, unrest, dissatisfaction, and doubt among the masses, and all classes, in every civilized part of the globe, in all communities and human organizations, in church and out of church, ecclesiastical bodies of all shades; besides the vast number of theories and doctrines of a popular socialistic, anti-poverty, communistic order, etc., a prevailing skepticism has seized the minds of men, as to the truth, validity, and stability of the entire religious fabric. The unsettled condition of the minds of men, the disturbing elements of the laboring classes, the church quarrels, clerical litigations, disputes, wrangling, and mutual hate about scriptural authenticity, its truth and supernaturalism, the heresies and blasphemies, the unsatisfactory condition of the Roman church, the constant and unremitting papal correspondence, the petty bickering, the selfish zeal, the greed for money, the anxiety to raise funds for all kinds of ecclesiastical establishments, naturally arouse suspicion whether the idea of a God is not going out of fashion, whether the clergy has not lost faith

in the Book, whether the Jew, the Jehovistic aristocrat, has not been the primary inventor of these supernatural wares, whether the Christian theologians are not beginning to lose their sway and grip and their pretended supernatural authority over their ignorant devotees. We may ask frankly, honestly, truthfully, and in perfect good faith:

Has not the time arrived for a grand and human reformation? For new methods of teaching, for new and more accurate ideas, for a more precise knowledge of the natural, for instructions in absolute facts, for a more thorough understanding of natural laws, for a broader comprehension of man himself and his surroundings, for an abandonment of all the supernatural subterfuge, ignorance, and superstition, of religious fables, miracles, false theories, and misleading doctrines as to God, with their immense sacrifice of human life.

Within the limits of the church nothing is to be hoped for, nor can anything be expected, except the greedy grasping of the hard-earned money of the ignorant laboring classes, the fanatical devotees, to sustain and uphold a mercenary priesthood, a rotten supernatural system that has proved so pernicious to mankind. Europe, at one time the rich pasture for the holy Roman Catholic apostolic church, no longer pours the milk and honey into the supreme pontiff's lap as of yore. In a letter dated "Rome, Feb. 3d," Ledochowski writes of Leo XIII.'s solicitude for the good of religion in these parts: "The supreme pontiff has many reasons of sadness on account of the distresses which the impudent endeavors of wicked men are trying to bring upon Christianity, especially in Europe. On the other hand, it is a great consolation to him to see the increase of Catholicism, with God's aid, elsewhere in the world." Of course Ledochowski signifies the pope's great admiration for the wonderful resources—for this flourishing, prolific, and generous American milch-cow. The Roman

administration, with that marvelous business tact so characteristic of that church, turns its tender attention, with all its pontifical flummery and grotesque maneuvers, to insinuate its methods upon this republic, to overawe us with a blaze of stupefaction, profounder ignorance and superstition, by honoring America with a resident tax-collector, and to save Gods, their divinities, with the Christ, Holy Ghost, Virgin Immaculate, saints, angels, and all the other theological absurdities.

Is it not high time for man and woman to learn that their dependence on any supernatural aid is futile, their prayers and appeals to an imaginary God worse than useless, their cringing fear for the so-called sacred authority cowardly, their submission to priestly rule and authority slavish, and the inculcating of biblical church lore stupefying? Is it not time for man and woman to comprehend themselves, their powers, the uses of their several organs, their functions, and the natural laws that govern them? That ideas, thought, consciousness, intellect, understanding, imagination, knowledge, etc., etc., are but the functions of nervous matter? That everything we know, have discovered, developed, or produced, is the natural product of nerve tissue.

In reviewing the history of this theologico-ecclesiastical organization—this Jehovistic Christianized system, from the very beginning to the present time, we find that this many-shaded, ever-changeable, greedy, grasping creed has done during the four thousand years of its existence a vast amount of mischief and little or no good. It had to be civilized instead of civilizing. Instead of elevating their followers, priests rather made every effort to keep them in subjection, steeped in ignorance and superstition.

In presenting these pages to the public, it is for the purpose of exposing some simple intelligible facts, some

wholesome truths, some few scientific revelations discovered by men of eminence, knowledge, and wisdom, regarding ourselves, this terrestrial globe, and the universe at large of which we are part. It is not possible in modern times to force men to believe, to accept the impossible. At this period of mental transition, the tendency is to think, to reason, to gain knowledge and truth, to be self-supporting, self-sustaining, independent, free, and untrammeled by barbaric delusion and terrorism. They no longer fear and cower before a shadow of some supernatural imaginary thing or being that has no existence and never had.

Man must learn to know that man is an evolution of nature's forces, a product of this terrestrial globe; that all the physical and physiological phenomena of his fine muscular and nervous system are the natural products and functions of his organization; that whether soul, spirit, God or Jehovah, they were evolved in the brain of man; that man, as man, with all his endowments, faculties, and capabilities, is part and parcel of this earth, a natural result of natural causes, and the supernatural, the God or gods, is the natural product of man's working faculties.

The scientific world has long since discarded every idea of anything supernatural, declared the impossibility, falsity, and absurdity of the scriptural fable, and that God, Jehovah, with all the ingenious priestly inventions, has proved itself pernicious and oppressive to humanity and contrary to intelligence, reason, and common sense. Man to know his rights must know himself, his nature and his natural surroundings, and if he knows himself, he will learn that God did not create man, but that man created God, and that every man is and must be his own God to be a true man. Know the natural, never mind the supernatural.

# THE CREATION OF GOD.

## CHAPTER I.

## UNIVERSAL ASPECT.

The beginning of intellectual development consists of observant experience. By frequent and repeated observation man acquired a familiarity with the subjects of that process—a clearer and better understanding of them.

Thus, the Chaldean shepherds, while minding their flocks of sheep and cattle, lazily and continuously watched the sky and starry hosts, and by degrees recognized, and acquired a knowledge of, many of the stars, laying the foundation for astronomy. Authorities state that they composed seventy-two volumes on that science, these books dating as far back as 2,540 B.C., treating of the polar star, Venus, Mars, and so on. It is possible that many errors attended their observations; many mistakes may have entered their explanations. That was natural, considering the remoteness of the times and the lack of facilities.

Knowledge and truth never come easily. The former is

very hard to acquire, the latter very difficult to discover.

Every truth, every new idea, has to battle against old established notions. If the new idea is persisted in, which is ordinarily the case, a struggle must ensue. The old idea resists, refuses to yield, no matter how false, ridiculous, or pernicious it may be. Yield, however, it must, and does in the course of time. Truth must win in the long run, though it has to fight its way through depths of ignorance, prejudice, and superstition, sustained by hate, bigotry, terrorism, and persecution.

As century after century passed in the Dark Ages, apostles of science and truth appeared, here and there, now and then, calm, dignified, patient, persistent and persevering, untiring, self-denying, men of superior intellect, unswayed and undismayed by existing authorities. These men gave us, though not a complete, a very ample revelation of nature, unfolding its mysteries, explaining its phenomena, making known the truth as far as men had been able to discover up to their time.

Nature with its laws man had to observe carefully in order to learn to unravel its secrets, its workings, its forces. There is no way to reveal them except through the mind of man. There are no means of knowing or discovering the intricacies and subtleties of nature's hidden and inexhaustible resources but by careful thought, reason, constant study and application. Not a single problem has ever been solved—in fact, one cannot be solved—except by acquired intellectual powers, developed by the refining process of education of the great nervous centers of man.

Many scholars have devoted and still devote their time, their energy, their life, in search of new facts, new truths, concerning the stars, planetary system, and this terrestrial globe we live on especially.

Centuries before Christ's time, and after, men were engaged in developing the science of Astronomy—Anaximander, Hipparchus, Ptolemy, Copernicus, Galileo, Newton, Herschel, and many others. These men were the apostles of truth, the teachers of facts, and some of them were martyrs to science.

The great civilizer, the press of modern times, was recently filled with accounts about the planet Mars, comet, etc., giving all the detailed information obtainable.

Everyone who reads the newspapers learns something about Mars, and ventures to give his opinion, whether it is like the earth—inhabited, has seas or atmosphere, etc. So that, whatever new facts are revealed, new truths announced, the minds of men are made so much richer.

Knowledge, the progress of science, the discoveries of important facts, the improvements of political, social, or civil laws, do not come to us spontaneously, nor do they come to us suddenly in overpowering quantities; it is a process of gradual acquirement, a slow accumulation, to which every generation contributes its quota of observation and experience that makes up the total wealth of aggregate thought, and is handed down from generation to generation, our common inheritance.

This common inheritance is neither all true nor all good. A large proportion that has been handed down to us by the ancients is not true or good, though it is believed to be true and good.

The revelations of absolute truths, of actual facts, are of more recent date—discoveries made within the last few centuries. The spurious, so-called revelations are the works of antiquity, which are not based on truth or fact or knowledge or experience. The mental faculties of pristine

men were primitive, and their ideas were as primitive. They lived in an age of infancy; it was all surprise, wonder, astonishment, and miracle.

When Kepler discovered the law that "Planets revolve in ellipses with the sun at one focus," he worked hard for many days, and after many trials succeeded. He also discovered a second law, which he defines, "A line connecting the center of the earth with the center of the sun passes over equal spaces in equal times;" and his third law, "The squares of the times of revolutions of the planets about the sun are proportioned to the center of their mean distance from the sun."

No one ever claimed for Kepler, nor has he laid claim himself, that he was inspired by God, or received the idea through any supernatural agency.

The hostile and bitter opposition that Galileo met on the part of the Christian Church is too well known; but the importance of his discoveries, and the truth, remains.

All intelligent persons ought to understand Newton's law of gravitation. If they understood the full import and significance of that law, they would never believe in the absurd miracles of Moses, Joshua, Elijah, Christ and Company. The law: "Every particle of matter in the universe attracts every other particle of matter with a force directly proportional to its quantity of matter, and decreasing as the square of the distance increases."

It is most remarkable—that man discovering great truths, concerning which there has never been any dispute, or controversy, or fight; that stand, unaltered and unchanged, forever. Such men have not been inspired by God, Jehovah, Christ, or the Holy Ghost, or anything supernatural. They have accomplished their works by their

powers of observation, great mental efforts, skillful explanation and elucidation, accomplished by hard and untiring work.

It is astonishing that, in the presence of so many revealed natural truths, so many ascertained scientific facts, and numerous discoveries in this century, which is claimed to be much advanced in civilization, intelligent persons—teachers, preachers, priests, and those laying claim to scholarship—still believe that the visionary figures, the product of distorted imagination or hallucination, of men like Isaiah, Ezekiel, etc., were of supernatural origin.

The incredible stories found in the Bible, the fabulous inventions concocted in the imagination of some person or persons away in Chaldea many thousand years ago, are still taught to be true, and the children in the Sunday-schools are instructed to believe these absurdities.

The undue haste exhibited in the first chapter of Genesis, in creating the earth, etc., is one of those wonderful puzzles to a child's mind. It is a something that is not easily explained at length to young people without awaking the suspicion of its impossibility, and requires considerable ingenuity to satisfy inquiring minds concerning it. The supernaturalists get over it by a final and complete answer, that admits of no argument—that "With God everything is possible." That being absolutely untrue, the answer explains nothing, but has a tendency to stupefy the child and hinder its educational advancement, for the reason that such an answer puts a stop to all farther inquiry. This really has been the effect of this pernicious teaching for many centuries.

All the stories, fables, myths, handed down to us from antiquity may be classed in the same category. There are many of them—yes, a perfect wilderness. All are true in

part, but false as a whole. Upon close examination we find glimmerings of truth in all of them. The difference lies in the kind, not in the quality. In the biblical story of creation, the writers had evidently observed, and knew, there were an earth, water, stars, and something above the earth which they called heaven, the atmosphere. That was the limit of their knowledge. They knew they existed, and things and objects that surrounded them existed, and they made an attempt in their primitive method to account for the manner in which these things came into existence. They could know nothing about it, because the most important discoveries were made thousands of years later.

Hesiod, 900 B.C., in his "Theogonia," invokes the Muses who inhabit the heavenly mansions, and whose knowledge of generation and birth he had formerly sung: "Tell, ye celestial powers, how first the gods and world were made; the rivers, and the boundless sea, with its strong surge. Also, the bright, shining stars, and wide-stretched heaven above, and all the gods that sprang from them, givers of good things." The Muses answer: "First of all existed chaos; next in order the broad-bosomed Earth; then Love appeared, the most beautiful of immortals. From chaos sprang Erebus and dusky night, and from night and Erebus came Ether and smiling day."

He gives a further description, which, like the foregoing, we know to be fiction, yet to contain elements of truth. We are not asked to believe all. He says:

"Look up, and view the immense expanse of heaven,
The boundless Ether in his genial arms
Clasping the earth. Him callest thou
God and Jove."

It is no easy matter for a man of ordinary education to form a notion of the mental crudeness of the lower type of the

human race of our own times; it is far more difficult for him to divest his mind of all its acquisitions through study and observation, and reduce his ideas to the level of those progenitors of his race, the men of antiquity.

When men had to struggle with savage beasts, it required superior intelligence to preserve themselves from destruction. That might have led to the worship of the strongest animals, such as the lion and the tiger. But no sooner did man learn the use of iron, which enabled him to kill these his gods, proving himself superior to the thing he worshiped, than these gods were thrown aside.

So long as man was unable to explain the mysterious appearances of the sun, moon, and stars, he endowed them with his own intelligence. He worshiped what was to him incomprehensible, mighty, wonderful; made images representing their phenomena or forces for his adoration. In his mind he pictured the sun as a warrior clad in golden panoply, the pale moon he regarded as the queen, and the stars as an immense host of spirits and heroes. Some interpreted the sun to be the child of darkness, the morning the bride of heaven, the clouds a fairy network, and the heat a friend of man; when the heat was very intense, then the sun was slaying his children. They would liken the dark clouds which rested on the earth to a terrible being whom they named the Snake or Dragon, that shut up the waters in his prisonhouse. When the thunder rolled they said that this hateful monster was uttering his hard riddles; and when, at last, the rain burst forth, they said that the bright sun had slain his enemy, and brought the stream of life for the thirsting earth.

Professor Max Müller says: “He begins to lift up his eyes; he stares at the tent of heaven, and asks, Who supports it? He opens his ears to the winds, and asks them, Whence and whither? He is awakened from darkness and slumber

by the light of the sun, and him whom his eyes cannot behold, and who seems to grant him the daily pittance of his existence, he calls his *life*, his *health*, his brilliant Lord and Protector. He gives names to all the powers of nature."

All sorts of names were invented to designate any particular force, phenomenon, or characteristic. In the Vedas the sun has twenty different names, each one descriptive of the sun or its aspect. In Persia the blazing sun was adored, and altars smoked perpetually of fire. In Gaul and Britain pillars were raised to the sun, altars to the moon, and fires were heaped under sacrificial caldrons to Cardwen, the earth-goddess.

Man's ideas of course underwent modifications as civilization advanced. The religious idea had taken root and elaborated ramifications, and laws were evolved to govern them. The sun of prosperity shone; communities grew stronger and more numerous; from the worship of the physical laws of nature, the laws governing morality became involved. Thus morals invaded nations, over which they enthroned their gods. Every nation elaborated its own details, and slowly took its relative position. As these gods grew in importance men assumed the responsibility to guard them, and the function to attend them. Thus a class called priests were chosen, elected, or self-appointed to minister to them. These functionaries at the same time assumed the moral and political guidance of nations or communities, and individuals. In this manner arose hundreds upon hundreds of Gods: Io, Isis, Jupiter, Juno, etc., etc.

The qualities of the gods, like the qualities of men, were good and bad. They were good and evil, light and dark, life and death, and were arranged to suit the time and occasion. When laws were established to govern society, obedience to these laws was declared to be right, disobedience wrong.

Men learned this; they became conscious of what was right and what was wrong. The ministration to these gods was acknowledged to be a righteous act. Rules were established to prevent any violation or infringement of the duty due to these gods. A trespass in violation of anything considered sacred was regarded as an evil—a sin. Slowly the consciousness of sin, of doing wrong, of violating the law, was recognized and established, and the attitude men assumed towards the gods, or their conduct towards them, was regarded as moral holiness, sanctity, or piety. The evolution of images, idols, gods and goddesses, was not the work of a day, but of very many centuries. The same may be said of sacrifices, worship, ceremonies, the laws concerning the same, holiness, sin, good and evil, sanctity, sacrilege, divinity, blasphemy, etc., etc.

Theologians, as well as theological philosophers and theorists, finding their pet notion of a god strangely interfered with and disturbed by the advancing progress in the knowledge of the natural sciences, bring to their aid additional proof to demonstrate the existence of a god, viz., that all races of men, wherever found, savage, barbarian, Indian, African, etc., on the different parts of the earth's surface, believe in a something higher and greater or more powerful than themselves, a spirit, a soul, a supernatural being. Unfortunately for their argument, this mental condition that is ascribed to the barbarians, etc., as being instinctive or innate—that is, this supernatural element—this having an idea of something they do not understand—proves the contrary, that there is no truth in their assumption. The very fact that they have gone through that process, or are going through it, shows it a kind of educational distemper of a lower order that all primitive races have to pass. As children who learn to read must first know their A B C, it is the road that leads to a higher grade of thought. They begin in surprise and wonder at the

natural, concerning which they know nothing. They fear, they adore the forces they cannot overcome. They make images of them in their likeness and worship them. When, however, they have learned through experience to overpower them, they cease to respect them. New forms are adopted, modifications made, and lastly so changed that but a mere shadow of the original remains.

All races began in a similar fashion, varying in form and method. The sun, clouds, atmosphere, seasons, oceans, thunder, and all other phenomena in nature—the inability to account for the existence of these led to worship, sacrifice, etc.; and images, idols, gods, originated; and in connection with them, stories, fables, myths, and fictions were supplied by the officiating priests or persons in attendance. The fanciful creations of the imagination hold good and will hold good so long as we do not know anything of the realities of life, of nature, of the actualities, of facts, of truth. But when the masses shall have learned more of nature, then the visionary, the imaginary god, the heirloom and heritage of our antiquated forefathers, will be thrown aside as the images were by Abraham, the idols dismissed or discarded later. The relics, the remnants, of this barbarism still have a hold on the minds of men.

Our entire religious fabric rests upon the creation as related in the Bible, handed down to us as the universally acknowledged text-book of all knowledge. The time was when it was dangerous to doubt, and imperiled one's safety or even life to openly state an opinion contrary to the supposed infallible assertions contained in the holy book.

The man or men who originally wrote that part of Genesis had not the remotest idea what he or they were talking about. He or they knew nothing of the subject-matter in consideration. The story told is like many other fables that had their origin in those early days of waking humanity.

The great masses are not very much better off to-day as regards these notions. They still believe in the Bible, and hang their hopes of salvation on its truth. The churches teach it, and it forms part and parcel of the church creed.

It will therefore do no harm to present a few facts—that the holiest priest cannot contradict, that the most pious preacher must admit—that admit of no argument or controversy, because absolutely true.

Every intelligent person knows that we live on this earth; that this earth is also called the world, and that this world is a planet; that this planet belongs to a family of planets. This planet of ours, this earth, belongs to a system of planets known as the solar system. And the solar system is mainly comprised within the limits of the Zodiacs. By the Zodiacs is meant a belt of the Celestial Sphere. 8° on each side of the Ecliptic is styled the Zodiac. This division is of very high antiquity, having been in use among the Hindoos and Egyptians. The Zodiac is divided into twelve equal parts, of 30° each, called signs, to each of which a fanciful name is given.

The sun is the center. Around him the planets revolve in ellipses.

The sun itself has a diameter of 866,000 miles. The major planets revolving around the sun as far as known are as follows:

| Name. | Distance from the sun. | Diameter. |
|---|---|---|
| Vulcan | 13,000,000 miles. | unknown. |
| Mercury | 36,000,000 ,, | 3,000 miles. |
| Venus | 67,000,000 ,, | 7,600 ,, |

| | | |
|---|---|---|
| Earth | 93,000,000 | 8,000 |
| | ,, | ,, |
| Mars | 141,000,000 | 4,200 |
| | ,, | ,, |
| Jupiter | 483,000,000 | 90,000 |
| | ,, | ,, |
| Saturn | 886,000,000 | 73,000 |
| | ,, | ,, |
| Uranus | 1,782,000,000 | 33,000 |
| | ,, | ,, |
| Neptune | 2,790,000,000 | 37,000 |
| | ,, | ,, |

It is not an easy matter to imagine that we are suspended in space; being held up, not by any visible object, but in accordance with the laws of universal gravitation, whereby each planet attracts every other planet and is in turn attracted by all.

There are a number of minor planets, satellites, a moon, and meteors or shooting-stars, and comets, etc., etc.

The sun, the great central globe, is so vast as to overcome the attraction of all the planets, and compel them to circle around him; next we come to the planets, each turning on its axis while it flies around the sun in an elliptical orbit; then accompanying them are the satellites or moons, each revolving about its own planet, while all whirl in a dizzy waltz about the central orb; next the comets, rushing across the planetary orbits at irregular intervals of time and space; and finally shooting-stars or meteors, darting hither and thither, interweaving all in apparently inextricable confusion. To make the picture more wonderful still, every member is flying with an inconceivable velocity, and yet with such accuracy that the solar system is the most perfect timepiece known.

The moon's distance from the earth is 239,000 miles; and it has a diameter of 2,160 miles.

The above gives some idea of the immensity of the solar system. And it is but one of the myriads of systems, and our earth a speck amidst it. If on a clear night we cast our eyes upwards, we behold a belt of closely dotted stars extending across the sky—the Milky Way. This galaxy, a luminous, cloudlike band, stretches across the heavens in a great circle, and contains myriads of stars, densely crowded together. Herschel remarks that 288,000 stars once passed across the field of his great reflector in forty-one minutes, and says: "Thus we are to think of our own sun as a star of the second or third magnitude, and of our little solar system as plunged far into the midst of the vortex of worlds, a mere atom along that

" 'Broad and ample road
Whose dust is gold and pavement stars.' "

## CHAPTER II.

# THE EARTH.

This earth we live on is a planet, and belongs to the solar system of planets. It shines brightly, and appears to other worlds as other planets do to us. It is nearly 25,000 miles in circumference, and has a diameter of a little over 8,000 miles. It is five and a half times denser than water, and weighs about 6,096,000,000,000,000,000,000 tons.

The atmosphere that surrounds this earth is like a shell that is two hundred to three hundred or more miles in thickness. We live at the bottom of an immense ocean of gaseous matter, which envelops everything, and presses upon everything with a force which appears, at first, perfectly incredible, but whose actual amount admits of easy proof. Gravity being, so far as is known, common to all matter, it is natural to expect that gases, being material substances, should be acted upon by the earth's attraction, as well as solids and liquids. This is really the case, and the result is the weight or pressure of the atmosphere, which is nothing more than the effect of the attraction of the earth on the particles of air. The amount of pressure exerted upon every square inch of the surface of the earth, and the objects thereon, is from fourteen to fifteen pounds. This enormous force is borne without inconvenience by the

animal frames, by reason of its perfect uniformity in every direction; and it may be doubled, or even tripled, without inconvenience. An important law which connects the volume occupied by a gas with the pressure made upon it, is expressed by Mariotte in the following manner. This law is usually called Mariotte's law: "The volume of gas is inversely as the pressure; the density and elastic force are directly as the pressure, and indirectly as the volume."

This law has been found to be true no matter how rarefied the air.

The atmosphere, like everything else on earth or connected therewith, and like all other planets known, and the earth itself, is composed of elements, as we shall see presently.

The atmospheric air is composed of gases, elementary substances, known by the names of Nitrogen and Oxygen, with variable proportions of carbonic acid and watery vapors, and usually a trace of ammonia. Besides these, there may occasionally be other substances present, depending upon local causes, as the odoriferous principles of plants and the miasmata of marshes, etc., etc.

Nearly three-fourths of the atmosphere is composed of nitrogen, while about one-fourth or less is oxygen. The following is the relative proportion:

| | **By weight.** | **By measure.** |
|---|---|---|
| Nitrogen | 76 .9 | 79 .3 |
| Oxygen | 23 .1 | 20 .7 |
| | 100 | 100 |

Its specific gravity is unity (1), being the standard with

which the density of all gaseous substances is compared. It is 814 times lighter than water, and nearly 11,065 times lighter than mercury; 100 cubic inches weigh 31 grains.

Oxygen is necessary to combustion, to the respiration of animals, and to various other natural operations, by all of which that gas is withdrawn from the air. It is obvious that its quantity would gradually diminish, unless the tendency of these causes were counteracted by some compensating process. This, to some considerable extent, is accomplished by vegetation, as it is found that healthy plants, under the influence of the sun's light, constantly draw carbonic acid from the air, the carbon of which is retained, while the oxygen is returned.

The atmosphere becomes less and less dense from the surface of the earth upwards.

Animals and vegetables exist in this atmosphere. They cannot exist in any other. All living things and beings live on this earth's crust. Vegetables are fixed to the soil of this earth, while animals move freely upon it.

*The earth's crust.*—Sir Charles Lyell speaking of this earth's crust says: "By the 'earth's crust' is meant that small portion of the surface of our planet which is accessible to human *observation*, or on which we are enabled to reason by observations made at or near the surface. These reasonings may extend to a depth of several miles, perhaps ten miles; and even then it may be said that such a thickness is no more than 1⁄400 part of the distance from the surface to the center. The remark is just, but although the dimensions of such a crust are, in truth, insignificant when compared with the entire globe, yet they are vast and of magnificent extent in relation to man and to the other organic beings which people our globe. Referring to this standard of magnitude, the geologist may admire the

ample limits of his domain, and admit at the same time that not only the exterior of the planet, but the entire earth, is but an atom in the midst of the countless worlds surveyed by the astronomer.

"The solid part of this earth consists of distinct substances, such as clay, chalk, sand, limestone, coal, slate, granite, and the like. It has been imagined that the various deposits on the earth's surface were created in their present form and in their present position. On the contrary, it has been shown that they have acquired their actual configuration and condition gradually, under a variety of circumstances, and at successive periods, during each of which distinct races of living beings have flourished on the land and in the waters, the remains of these creatures still lying buried in the crust of the earth.

"The materials of this crust are not thrown together confusedly; but distinct mineral masses called rock are found to occupy definite spaces and to exhibit a certain order of arrangement. These rocks are divided into four great classes by reference to their different origin, or in other words by reference to the different circumstances and causes by which they have been produced.

"The first two divisions, which will at once be understood as natural, are the aqueous and volcanic, or the products of water and those of igneous action at or near the surface.… The aqueous rocks, sometimes called sedimentary or fossiliferous, cover a larger part of the earth's surface than any other. These rocks are stratified, or divided into distinct layers or strata; these strata have been generally spread out by the action of water, like what we daily see taking place near the mouth of rivers or on the land during a temporary inundation.

"The remains of animals, especially of aquatic species, are

found almost everywhere, imbedded in stratified rocks; and sometimes, in the case of limestone, they are in such abundance as to constitute the entire mass of rock itself. Shells and corals are the most frequent, and with them are often associated the bones and teeth of fishes, fragments of wood, impressions of leaves, and other organic substances.

"When geology was first cultivated, it was a general belief that those marine shells and other fossils were the effects and proofs of the deluge of Noah; but all those who have carefully investigated the phenomena have rejected this doctrine. A transient flood might be supposed to leave behind it, here and there upon the surface, scattered heaps of mud and sand and shingle, with shells confusedly intermixed; but the strata containing fossils are not superficial deposits, and do not simply cover the earth, but constitute the entire mass of mountains. Ample proof of these reiterated revelations is given, and it will be seen that many distinct sets of sedimentary strata, each several hundreds or thousands of feet thick, are piled one upon the other in the earth's crust, each containing peculiar fossil animals and plants, which are distinguishable, with few exceptions, from species now living. The mass of some of these strata consists almost entirely of corals, others are made up of shells, others of plants turned into coal, while some are without fossil.

"Volcanic rocks are those which have been produced at or near the surface, whether in ancient or modern times, not by water, but by the action of fire or subterranean heat. These rocks are for the most part unstratified, and are devoid of fossils.

"There are two other divisions of rock, called Plutonic rocks, granite, etc., and Metamorphic, or stratified crystalline rocks. The members of both these divisions of rocks agree in being highly crystalline and destitute of

organic remains.

"The composition of the aqueous rocks, mineral composition of strata: These may be said to belong principally to three divisions, as follows:

"1. *Arenaceous or siliceous rocks.* Beds of loose sand frequently met with, of which the grains consist entirely of silex, which term comprehends all purely siliceous minerals, as quartz and common flint. Quartz is silex in its purest form; flint usually contains some admixture of alumina and the oxide of iron. Silica is the mineral used in the manufacture of glass, mixed with a little potassium oxide and lime, or lead, etc.

"2. *Argillaceous rock.* A mixture of silex or flint with a large proportion, usually about one-fourth, of alumina or argil; but in common language, any earth which possesses sufficient ductility, when kneaded up with water, to be fashioned like paste by the hand or by the potter's lathe, is called clay. Such clays vary greatly in their composition. They are, in general, nothing more than mud derived from the decomposition or wearing down of various rocks. The purest clay in nature is porcelain clay or kaolin, which results from the decomposition of a rock composed of feldspar and quartz, and it is almost always mixed with quartz. (The kaolin of China consists of 71.15 parts of silex, 15.86 of alumina, 1.92 of lime, and 6.73 of water.)… One general character of all argillaceous rocks is to give out a peculiar, earthy odor when breathed upon, which is a test of the presence of alumina.

"3. *Calcareous Rocks.* These consist mainly of chalk—lime and carbonic acid. Shells and corals also are formed of the same elements, with the addition of animal matter. Any limestone which is sufficiently hard to take a fine polish is called *marble*. Many of these are fossiliferous; but

statuary marble, which is also called saccharine limestone, as having a texture resembling that of loaf-sugar, is devoid of fossil. *Siliceous limestone* is an intimate mixture of carbonate of lime and flint, and is harder in proportion as the flinty matter predominates. *Marl slate* bears the same relation to marl which shale bears to clay, being calcareous shale. *Magnesian* limestone is composed of carbonate of lime and carbonate of magnesia; the proportion of the latter amounting in some cases to nearly one-half. It effervesces much more slowly and feebly with acid than common limestone. *Gypsum* is a rock composed of sulphuric acid, lime, and water. It is usually a soft whitish-yellow rock, with a texture resembling loaf-sugar, but sometimes it is entirely composed of lenticular crystals. *Alabaster* is a granular and compact variety of gypsum found in masses large enough to be used in sculpture and architecture. It is sometimes a pure snow-white substance. It is a softer stone than marble and more easily wrought."

When geologists examine the earth's crust, they usually commence with the surface on which we live, and search downwards as far as possible. Lyell constructed a tabular view of the fossiliferous strata.

It must be borne in mind that we have no other methods of ascertaining the truth than by close observation, making diligent search, in order to discover what this earth's crust is made of. We have no supernatural facilities to give us information, and we are very certain there never were any. What information we are reckoned to have, handed down by our antiquated barbarian forefathers, is of a different nature. It refers—briefly stated—to the conduct of Man, the manner in which he shall act as an individual, or collectively as a community; including a great number of what are considered now theatrical or mountebank ceremonies, fancy customs, sacrifices, and a repetition of certain phrases, ordinarily called prayers, accompanied by

illustrative images and pictures, and movements of body—fantastic symbols and devices created and prescribed by man.

Having no other means of ascertaining facts, man was naturally compelled to search for testimony in the earth's crust—to discover what it is composed of; the kind of material; how it was formed; the time it took to form; the period that elapsed between formations; how the layers or strata were superposed one upon another; what substances were found in them; where organic life was first found; what it consisted of; when man first appeared. By examining this table we get a glimpse of the true state of things. This shows the order of superposition, or chronological succession, of the principal European groups:

I. Post-Tertiary. A. *Post-Pliocene.*

Periods and Groups.

1. Recent. Peat mosses, shell marls, with bones of land animals, human remains and works of art. Newer parts of modern deltas and coral reefs.

2. Post-Pliocene. Clay, marl, volcanic trap. All the shell of living specimens. No human remains or works of art. Bones of quadrupeds, partly of extinct species.

II. Tertiary. B. *Pliocene.*

3. Newer Pliocene. Boulder formation. Cavern formation, or Pleistocene. Three-fourths of fossil shells of extinct species. A majority of the mammals extinct; but the genera corresponding with those now surviving in the same great geographical and zoological provinces. Icebergs frequent in the seas; glaciers on hills of moderate height.

4. Older Pliocene. A third or more of the species of mollusca extinct. Nearly, if not all, the mammalia extinct.

C. *Miocene.*

5. Miocene. About two-thirds of the species of shells extinct. All the mammalia extinct.

D. *Eocene.*

6. Upper Eocene.
7. Middle Eocene. } Fossil shells of the Eocene period, with very few exceptions, extinct. All the mammalia of extinct species, and the greater part of them of extinct genera. Plants of Upper Eocene indicating a south European or Mediterranean climate; those of Lower Eocene a tropical climate.
8. Lower Eocene.

III. Secondary. E. *Cretaceous*—Upper.

9. Maestricht beds. Yellowish-white limestone. Large marine saurians, etc.

10. Upper white chalk. Marine limestone composed in part of decomposed corals.

11. Lower white chalk.

12. Upper green sand.

13. Gault. Dark-blue marl at base of chalk escarpment. Numerous extinct genera—conchiferous cephalopoda, etc.

14. Lower green sand. Species of shells, etc., nearly all distinct from those of Upper Cretaceous.

F. *Wealden.*

15. Weald clay, of fresh-water origin. Shells of Pulmoniferous mollusca.

16. Hastings sand. Fresh water. Reptiles of, etc.

17. Purbeck beds. Limestone, calcareous slate, etc. Roots of trees; plants, etc.

G. *Oölite.*

18. Upper Oölite. Portland building-stone, sand.

19. Middle Oölite. Oxford clay, dark-blue clay. Large saurians.

20. Lower Oölite. Preponderance of ganoid fish. Plants chiefly cycads, conifers, and ferns.

H. *Lias.*

21. Argillaceous limestone, marl clay. Mollusca, reptiles, and fish analogous to the Oölitic.

I. *Trias.*

22. Upper Trias. Red, gray, green, blue, and white marls, and sandstone, with gypsum. Batrachian reptiles.

23. Middle Trias. Compact grayish limestone, with beds of muschelkalk, of dolomite and gypsum.

24. Lower Trias. Plants different for the most part.

IV. Primary. J. *Permian.*

25. Upper Permian. Yellow magnesian limestone. Organic remains both animal and vegetable, more allied to primary

than to secondary period.

26. Lower Permian. Marl slate. Thecodont saurians, heterocercal fish, etc.

K. *Carboniferous.*

27. Coal measures. Great thickness of strata of fluvio-marine origin, with beds of coal of vegetable origin, based on soils retaining roots of trees. Oldest of known reptiles. Sauroid fish.

28. Mountain. Carboniferous or mountain limestone. Limestone with marine shells and corals, etc.

L. *Devonian.*

29. Upper Devonian. Yellow sandstone, paving and roofing stone. Tribe of fish with hard coverings. No reptiles yet known.

30. Lower Devonian. Gray sandstone.

M. *Silurian.*

31. Upper Silurian. Tilestone. Oldest fossil fish yet discovered. Trilobites, etc.

32. Lower Silurian. Caradoc sandstone, etc. No land plants yet known. Footprints of tortoise, etc.

33. Upper and Lower *Cambrian*.

SYNOPSIS.

Post-Tertiary.

Pliocene.
Miocene.

Eocene.
Cretaceous.
Jurassic. } Secondary or Mesozoic.
Triassic.
Permian.
Carboniferous.
Devonian.
Silurian. } Primary or Paleozoic. } Paleozoic.
Cambrian.

The precise chemical action upon the elements composing these various geological formations at different remote periods, is no doubt difficult to ascertain. That there always has been some chemical action going on, and that it is continually going on, is certain. How and to what extent we can judge only from the experience of actual observation in the laboratory.

Mr. Crale remarks: “The whole surface of the land is exposed to chemical action of the air, and of the rainwater with its dissolved carbonic acid, and in colder countries the frost. The disintegrated matter is carried down the slopes during heavy rain; and, to a greater extent than might be supposed, especially in arid districts, by the wind; it is then transported by the streams and rivers, which when rapid deepen their channels and triturate the fragments.” Darwin

says: “If the theory be true” (speaking of the time elapsed since the Cambrian lowest formation) “it is indisputable that before the lowest Cambrian stratum was deposited, long periods elapsed, as long as, or probably far longer than, the whole interval from the Cambrian age to the present day; that during these vast periods, the world swarmed with living creatures. Here we encounter a formidable objection; for it seems doubtful whether the earth, in a fit state for the habitation of living creatures, has lasted long enough. Sir W. Thompson concludes that the consolidation of the crust can hardly have occurred less than 20 or more than 400 million years ago, but probably not less than 98 or more than 200 millions of years. These very wide limits show how doubtful the data are; and other elements may have hereafter to be introduced into the problem. Mr. Crale estimates that about 60 million years have elapsed since the Cambrian period, but this, judging from the small amount of organic change since the commencement of the glacial epoch, appears a very short time for the many and great mutations of life, which have certainly occurred since the Cambrian formation; and the previous 140 millions of years can hardly be considered as sufficient for the development of the varied forms of life which already existed during the Cambrian period.”

It seems almost impossible for an ordinary mind to grasp the magnitude of the figures, the span of life being so short. Yet some idea may be formed when we compare the age of this earth’s crust formation, the hundreds of thousands of years that passed in the evolution of man, and the brief space of time that has elapsed since he has become enabled to give an account of himself.

As regards the thickness of the earth’s crust, Professor Ramsey has given the maximum thickness, from actual measurement in most cases, of the successive formations in different parts of Great Britain; and this is the result:

| | | |
|---|---|---|
| The Paleozoic strata (not including igneous bed), | 57,154 | feet. |
| Secondary, | 13,190 | ,, |
| Tertiary, | 2,240 | ,, |

making altogether 72,584 feet; that is, very nearly thirteen and three-quarters British miles. Büchner in his work on "Force and Matter" states: "The so-called coal formation alone required, according to Bischoff, 1,000,177 years; according to Chevandier's calculation, 672,788 years. The Tertiary strata required for their development about 350,000 years; and before the originally incandescent earth could cool down from a temperature of 2,000 degrees to 200, there must, according to Bischoff's calculation, have elapsed a period of 350,000,000 years. Valger calculates that the time required for the deposit of the strata known to us must at least have amounted to 648,000,000 years. I quote these figures simply to show how difficult it is, and the labor required, to form even a proximate idea as to the period of time that must have elapsed for the formation of the various strata known.

That all animals were not created at once is certain beyond all cavil and dispute. The development of the various forms of life was an exceeding slow process, and lasted very many thousand centuries. That the earth's crust was not at certain stages of formation in a fit condition either to receive or to maintain the higher types of animal life, is well known. And we know that man's remains are found only in the uppermost surface of the earth's crust. Max Müller says in his "Testimony of the Rocks": "It was not until the earlier ages of the Oölite system had passed away, that the class of Reptiles received its fullest development. And certainly very wonderful was the development which

it did then receive. Reptiles became everywhere the lords and masters of the lower world. When any class of air-breathing vertebrates is very largely developed, we find it taking possession of all three terrestrial elements—earth, air, and water. Last of all, the true placental mammals appear, and thus, tried by the test of perfect reproduction, the great vertebral division receives its full development." Agassiz's "Principles of Zoology" says: "We distinguish four ages of nature, comprehending the great geological divisions, namely:

"1. The Primary, or Paleozoic age, comprising the lower Silurian, the upper Silurian, and the Devonian. During this age there were no air-breathing animals. The fishes were masters of creation. We may therefore call it the Reign of Fishes.

"2. The Secondary age, comprising the Carboniferous, the Trias, the Oölite, and the Cretaceous formations. This is the epoch in which air-breathing animals first appear. The Reptiles predominated over the other classes, and we may therefore call it the 'Reign of Reptiles.'

"3. The Tertiary age, comprising the Tertiary formation. During this age terrestrial mammals of great size abound. This is the Reign of Mammals.

"4. The Modern age, characterized by the appearance of the most perfect of created beings."

The majority of mankind trouble themselves but little whether progress is made in any one of the branches of science or not. Man has no time to think seriously of anything except to provide food for his family. The priest does his thinking, and he is made to contribute part of his labor to support the holy man who does the thinking for him. All he knows is that his soul or his spirit, his

hereafter, and his God are well cared for, and he pays for it. Yet every man ought to understand that all his rights, civil and political—all the freedom he enjoys—he has to thank science for procuring and securing.

"Shall it be seriously objected to the application of the sciences to philosophical problems that its results are not agreeable? That the truth is not always agreeable, nor always consolatory, nor always religious, nor always acceptable, is as well known as the old experience of the almost total absence of reward, either external or internal, provided for its exemplars. What this or that man may understand by a governing reason, an absolute power, a universal soul, a personal God … is his own affair. The theologians, with their articles of faith, must be left to themselves; so of the naturalists with their science; they both proceed by different routes.… The same bloody hatred with which science was once persecuted by religious fanaticism would revive now, and with it the Inquisition and Auto-da-fé, and all the horrors with which a refined zealotism has tortured humanity would be resorted to, to satisfy the wishes of the theological cutthroats. A man in advance of his age beholds the struggle of the contending parties from a high point of view, and sees in the eccentricities of this contest merely the natural and necessary expression of the opposing elements which agitate our time. No one can doubt that truth will finally emerge the victor. It certainly will not be long before the battle becomes general. Is the victory doubtful? The struggle is unequal; the opponents cannot stand against the trenchant arm of physical and physiological Materialism, which fights with facts, that everyone can comprehend, while the opponents fight with suppositions and presumptions" (Büchner).

"Science and faith exclude each other" (Virchow).

Fools still cling to faith; wise men find the truth in science.

Note.—Baily's "History of Astronomy," Part I, page 31, § 124, and Part II, pp. 33, 39, maintains that India has existed as a nation, as the records show, 4,320,000 years. The Indians divide this time into four principal periods: First period, that of innocence or simplicity, 1,728,000 years; second period, 276,000; the third period, 864,000; and the ages of misfortune about 422,000—Cali-yon-gan period. Similar statements are made by Cicero ("De Divinat," I, 19), concerning the Chaldeans: "Condemnemus, inquam, hos aut stultitiæ aut vanitatis aut imprudentiæ qui 470 millia annorum ut ipsi dicunt monumentis comprehensa continent."

## THE ATMOSPHERE.

The atmosphere is the gaseous envelope encircling the earth; and it constitutes the ocean of air at the bottom of which we live. We become aware of the existence of the air when we move rapidly and experience the resistance offered to the passage of our bodies, and also when the air is set in motion, giving rise to a wind. We notice the pressure of the atmosphere if we withdraw the air from beneath the hand by a powerful air-pump, for we then find that the hand is pressed down with a force equal to 1.033 kilos. on a square centimeter, or nearly 15 lbs. on every square inch. The total atmospheric pressure which the human body has to support hence amounts to several tons. But this pressure is not felt under ordinary circumstances, because the pressure exercised is exerted equally in every direction. The instrument used for measuring the pressure of the air is termed a barometer, and the average pressure at the sea level is equal to that exerted by a column of mercury 760 mm. high. The air being elastic and having weight, it is clear the lower layers of air must be more

compressed than those above them, and hence the density of the air must vary at the different hights above the sea level. The density of the air being thus dependent on the pressure to which it is subjected, the higher strata of air become generally rarefied, and it is hence difficult to say whereabouts the air ceases, but it appears that the limit of the atmosphere is about 200 to 300 miles from the level of the sea. If the whole atmosphere were of the same density throughout as it is at the earth's surface, it would reach only to a height of a little more than five miles above the sea level.

Aqueous vapor is contained in the air in quantities varying in different localities and at different times, and depending mainly on the temperature of the air. Air at a given temperature cannot contain more than a certain quantity of moisture in solution; and when it has taken up its maximum quantity, it is said to be saturated with aqueous moisture. The higher the temperature of the air the more water can it retain as vapor; and when air saturated with moisture is cooled, the water is deposited in liquid form in very small globules, forming a mist, fog, or cloud. This is the cause of the fall of rain, snow, and hail; when warm air heavily laden with moisture from the ocean passes into a higher and colder position, or meets with a stratum of air of lower temperature, it cannot any longer retain so much aqueous vapor, and a large quantity assumes a liquid form, falling as rain when the temperature is above the freezing-point, or crystallizing as snowflakes if the temperature is below that point. Hail is caused by the congelation of raindrops in passing through a stratum of air below the freezing-point. The deposition of dew is caused by the rapid cooling of the earth's surface by radiation after sunset, and by the consequent cooling of the air near the ground below the temperature at which it begins to deposit moisture. In general the air contains from 50 to 70 per

cent. of aqueous vapor of the quantities necessary to saturate it. If the quantity be not within these limits the air is either unpleasantly dry or unpleasantly moist.

The air contains, besides the gases of oxygen and nitrogen, carbonic acid, ammonia, accidental impurities, and volatile organic matter, which latter is the most important, as it probably influences to a great extent the healthfulness of the special situation. We become aware of the existence of such organic putrescent substances when entering a crowded room from the fresh air; and it is probable that the well-known unhealthiness of marshy and other districts is owing to the presence of some organic impurities.

We may have occasion to refer to this when speaking of the deluge, etc.

## CHAPTER III.

# THE CHEMICAL ASPECT.

By the word chemistry we understand the science which investigates the composition of all material substances, taking them apart or separating them, by a chemical process, and discovers the nature and properties of the minutest particle. These small particles have received the name, elements or elementary substances; that term is applied in chemistry to those forms of matter which have hitherto resisted all attempt to decompose them.

“We know that we have earth, air, water, and we have seen in Chapter II that the earth’s crust is made up of many substances, rocks, coral reefs, clay, marl, feldspar, quartz, limestone, granite, etc., etc. These substances are composed of small particles, or elements, and are called minerals or inorganic substances. There is another class of substances, called organic, that are derived from living things or beings. These are also taken apart or separated into their elementary substances. As plants or animals, all such elementary substances have received the name organic substances because plants and animals have organs of reproduction, hence the name.

The taking apart of any substance into its constituent

elements is called *analysis* by chemists.

The same elements can also be put together to produce various substances; that is termed *synthesis*.

Chemists have adopted a name for each of the elements, and these names are represented by symbols, or letters.

Compound substances may contain two or more elements. When the composition of a substance is determined by splitting the compound into its elementary constituents a chemical analysis of that substance is said to have been made; and if the proportions by weight in which each of the constituents is present be determined, a *quantitative* analysis of the substance has been made, etc.

By chemical action, we signify that which occurs when two or more substances so act upon one another as to produce a third substance differing altogether from the original ones in properties; or when a substance is brought under such conditions that it forms two or more bodies differing from the original one in properties. Chemistry is called an experimental science. In investigating all the materials within his reach, whether solid, liquid, or gaseous, whether contained in the earth, sea, or air; whether belonging to the mineral, animal, or vegetable creation, the chemist finds himself obliged to divide substances into two classes: (1) compound substances—those which he is able to split up into two or more essentially different materials; (2) elements or simple substances—those which he is unable thus to split up, and out of which nothing essentially different from the original substances has been obtained.

Compound bodies are made up of two or more elementary substances chemically combined with each other; thus sulphur, copper, lead, are elementary bodies; out of each of

these nothing different from sulphur, copper, lead, can be obtained; whereas when two of these bodies are heated together, a compound is formed from which both of the original elementary constituents can at any time be obtained. Water is a compound body—it can be split up into two elementary gases, hydrogen and oxygen; common salt, again, is a compound of a gas (chlorine) with a metal (sodium); and limestone, clay, sugar, and wax may serve as examples of compound bodies; whilst phosphorus, charcoal, iron, mercury, and gold may be mentioned as belonging to the class of simple substances.

As to physical properties of gases—they have weight, volume, diffusion, density, etc.

Theologians insist that there is a God, a God that was first introduced to us by a man with the name of Abraham, advertised by Moses, and has been palmed off upon the masses as a something exceedingly wonderful. A multitude of men who find it to their interest to advocate his pretended claims, are still doing their utmost to sustain their God. We are trying to discover where he is to be found, whether he is a local or a universal God, what he is composed of, whether he resides on earth permanently or transiently, whether he controls the entire solar system or more systems, whether he occasionally takes a trip to other planets; and if he has created everything we want to find out how he has created it. For that reason we have to search, taking a glimpse among the stars, in the earth, atmosphere, etc. Since geology does not respond favorably, we are trying to discover what this earth is composed of. The elementary bodies at present recognized amount to sixty-four in number. Of these about fifty belong to the class called *metals*. Several of them are of recent discovery, and as yet very imperfectly known. The distinction between metals and certain non-metallic substances or *metalloids*, although very convenient for

purposes of description, is entirely arbitrary, since the classes graduate into each other in the most indefinite manner. The following is a complete list of the elementary substances known, giving their names, symbols, and combining weight:

| | Symbols. | METALLOIDS. | Combining Weight. | |
|---|---|---|---|---|
| Elements of life: of primary importance. | O | Oxygen | II | 16 |
| | H | Hydrogen | I | 1 |
| | N | Nitrogen | V | 14 |
| | C | Carbon | IV | 12 |
| Elements of secondary importance. | Cl | Chlorine | I | 35 .5 |
| | Br | Bromine | I | 80 |
| | I | Iodine | I | 127 |
| | F | Fluorine | I | 29 |
| | P | Phosphorus | V | 31 |
| | S | Sulphur | VI | 32 |
| | Si | Silicon | IV | 28 |
| | B | Boron | III | 11 |
| | Se | Selenium | VI | 79 .5 |
| | Te | Tellurium | VI | 179 |

| | | | | | |
|---|---|---|---|---|---|
| | | Al | Aluminium | IV | 27 .4 |
| Mechanics, arts, science, and medicine. | | Ca | Calcium | II | 40 |
| | (Cuprum) | Cu | Copper | II | 63 .5 |
| | (Ferrum) | Fe | Iron | IV | 56 |
| | (Plumbum) | Pb | Lead | IV | 207 |
| | | Mn | Manganese | IV | 55 |
| | (Hydrargyrum) | Hg | Mercury | II | 200 |
| | (Kalium) | K | Potassium | I | 39 .1 |
| | (Argentum) | Ag | Silver | I | 108 |
| | (Natrium) | Na | Sodium | I | 23 |
| | (Stannum) | Sn | Tin | IV | 118 |
| | | Zn | Zinc | II | 65 .3 |
| | (Stibium) | Sb | Antimony | V | 122 |
| | | As | Arsenic | V | 75 |
| | | Ba | Barium | II | 137 |
| | | Bi | Bismuth | V | 210 |
| | | Cr | Chromium | VI | 52 .2 |
| | | Co | Cobalt | IV | 58 .7 |
| | (Aurum) | Au | Gold | III | 197 |
| | | In | Indium | IV | 74 |

| | | | |
|---|---|---|---|
| Mg | Magnesium | II | 24 |
| Ni | Nickel | IV | 58 .7 |
| Pd | 2Palladium | IV | 106 .6 |
| Pt | Platinum | IV | 197 .5 |
| Sr | Strontium | II | 87 .5 |
| Ti | Titanium | IV | 50 |
| W | Tungsten | VI | 184 |
| U | Uranium | IV | 120 |

| | | | |
|---|---|---|---|
| Be | Beryllium | II | 9 .3 |

Little known, rarely used.

| | | | |
|---|---|---|---|
| Cd | Cadmium | II | 112 |
| Cs | Cæsium | I | 133 |
| Cr | Cerium | IV | 92 |
| D | Didymium | II | 95 |
| E | Erbium | II | 112 .6 |
| Ir | Iridium | IV | 198 |
| La | Lanthanum | II | 92 |
| Li | 3Lithium | I | 7 |

| | | | |
|---|---|---|---|
| Mo | Molybdenum | VI | 96 |
| Nb | Niobium | V | 94 |
| Os | Osmium | IV | 199.2 |
| Rh | Rhodium | IV | 104.4 |
| Rb | Rubidium | I | 85.4 |
| Ru | Ruthenium | IV | 104.4 |
| Ta | Tantalum | V | 182 |
| Tb | Terbium | | |
| Tl | Thallium | III | 204 |
| Th | Thorium | II | 231.5 |
| V | Vanadium | V | 51.3 |
| Y | Yttrium | II | 61 |
| Zr | Zirconium | III | 89.6 |

All matter is made up of very small particles which are chemically indivisible and which are termed atoms, and the atom of each elementary substance differs essentially from that of every other. All the atoms of each element are alike, and chemical compounds are formed by the combination of unlike atoms. Hence the smallest particle of a compound consists of a group of atoms. This group, which can be divided by chemical but not by mechanical means, is termed a molecule. The smallest particle of an element in a free state is, however, not a single atom, but a group of atoms mechanically indivisible, or a molecule. This explains why elementary bodies act more energetically and enter more readily into combination at the moment of their liberation from a combination than when in the free state.

When chemical changes occur, it is the molecules which react upon one another, and the change consists in the change of position of certain atoms contained in the groups. When an element is set free from a compound, the liberated join together to form molecules, unless some

body is present with which the element can combine.

By an atom we therefore understand the smallest portion of a chemical element which can enter into a chemical compound; by a molecule, the smallest portion of a simple compound body which can occur in the free state or which can take part in a chemical action.

All the elements, with the single exception of fluorine, combine with oxygen to form oxides. In this act of combination, which is termed oxidation, heat is always, and light is frequently, given off. When bodies unite with oxygen, evolving light and heat, they are said to burn, or undergo combustion. All bodies which burn in the air burn with increased brilliancy in oxygen gas; and many substances, such as iron, which do not readily burn in the air, may be made to do so in oxygen.

Oxygen is a colorless invisible gas, possessing neither taste nor smell.

Hydrogen is a colorless invisible gas, possessing neither taste nor smell. It is the lightest gas known, being 14.47 times lighter than air. It combines with oxygen to form water.

Nitrogen is a colorless, tasteless, inodorous gas, slightly lighter than air. It does not combine readily with bodies, and it is a very inert substance, neither supporting combustion or animal life, nor burning itself. It has, however, no poisonous qualities, and animals plunged into a jar of this gas die simply of suffocation from want of oxygen. Nitrogen exists in a free state in the air, of which it constitutes four-fifths by bulk. It occurs combined in the bodies of plants and animals, and in various chemical compounds, such as nitre, whence the gas derives its name.

Carbon is a solid element; it is not known in the free state, either as a liquid or as a gas. Carbon is remarkable as existing in three distinct forms, which in outward appearance or physical properties have nothing in common, whilst their chemical relations are identical. These three allotropic forms of carbon are (1) diamond, (2) graphite or plumbago, (3) charcoal. These substances differ in hardness, color, specific gravity, etc., but they each yield on combustion in the air or oxygen the same weight of the same substance, carbonic acid or carbon dioxide. Carbon is the element which is especially characteristic of *animal* and *vegetable* life, as every organized structure, from the simplest to the most complicated, contains carbon. If carbon were not present on the earth, no single vegetable or animal body such as we know could exist. In addition to the carbon which is found free in these three forms, and contained combined with hydrogen and oxygen in the bodies of plants and animals, it exists combined with oxygen as free carbon dioxide in the air, and with calcium and oxygen as calcium carbonate in limestone, chalk, marble, corals, shells, etc. Plants are able when exposed to sunlight to decompose the carbon dioxide in the air, liberating the oxygen, and taking the carbon for the formation of their vegetable structure, whilst all animals, living directly or indirectly upon vegetables, absorb oxygen, and evolve carbon dioxide. Thus the sun's rays, through the medium of plants, effect deoxidation, or reduction, whilst animals act as oxidizing agents with respect to carbon.

*Oxygen*, *Hydrogen*, *Nitrogen*, *Carbon*—these are the life-giving elements. They are the life-producing and life-sustaining elements. Neither animal nor vegetable life can exist without them. The entire activity of nature depends upon them. Every organic substance contains them.

No organic substance can exist without them.

The principle of life is due to them.

From a blade of grass to an insect, from an insect to an animal, including man, one cannot emerge into life without these elements.

The birth, growth, and development of plant and animal depend upon them, the sustenance and nurture.

All our food-substances are almost wholly made up of these elements.

No force, power, or energy can be produced without their presence.

Our muscular strength, our nervous force, our very thoughts, our imagination, as well as digestion, respiration, circulation of the blood, depend on these elements.

Our sensations, our pleasures, our pains, depend upon them. All the excitement and depression in life are dependent on them.

The beauties of vegetation, all the various shades and colors of flower and blossom, the tints and odors, are dependent on them.

No phenomenon in nature, no matter how terrible, delightful, or enchanting, can be manifested without these elements.

No earthquake, thunder, storm, lightning, wind, hail, rain, snow, or ice could exist without them.

No light, heat, or motion—in fact, none of the physical forces, could be evolved without them.

Our atmosphere, ocean, seas, rivers, forests, are composed

of them.

No art, science, mechanics, architecture, nor indeed anything that we now enjoy, could exist without them.

Gunpowder, dynamite, electricity, and all else are dependent on these elements.

Why attempt to enumerate the extraordinary roles they play on earth and in the universe?

Every plant would wither, every life would perish, without Oxygen; this element may be truly called the breath of life.

The creation of God is dependent on these elements, because were it not for man God would never have been.

The ark, made of wood, was composed of them. The figure of Christ, and the Virgin Mary, as she is called, as well as all the saints, were and are composed of Oxygen, Carbon, Nitrogen, Hydrogen, etc. We know that these chemical elements enter into the composition of all things in nature —mineral, vegetable, animal.

We also may be absolutely certain that no more elements exist now, at this present time, than existed ten, twenty, or one thousand million of years ago.

Chemical elementary substances have no greater relative weight towards one another, nor a greater volume, at this present time than they had at any time since the existence of this earth. The total weight of all elements that enter into the formation of this terrestrial globe has never varied, whether they were in solid, fluid, or gaseous state.

The law of gravitation has always existed.

Elements that enter into the formation of organic beings,

vegetable or animal, must in due time undergo decomposition and return to the same elements of which they were composed.

The chemical action has always been the same. All substances are subject to chemical action when exposed to the primary elements, oxygen and hydrogen especially.

An element can never be annihilated.

It may not be out of place to mention some of the substances in daily use. For example, water is composed of oxygen and hydrogen. Air is composed of oxygen and nitrogen. Bread, of starch, sugars—oxygen, hydrogen and carbon. Meats, of oxygen, hydrogen, carbon, and nitrogen, etc. Salt, of sodium and chlorine. Vegetables, fruits, etc., of oxygen, carbon, and hydrogen. Fats, of oil. alcohols, of oxygen, carbon, and hydrogen. The tissues of the animal body are composed of oxygen, hydrogen, carbon, and nitrogen.

The combination of five elements produces electricity, thus: Zinc (Zn) + copper (Cu) + sulphuric acid, which consists of hydrogen ($H_2$), sulphur (S), and oxygen ($O_4$), = electricity.

A few examples in the changes of the combination of oxygen and hydrogen are shown in water. Under conditions of heat and cold it becomes ice, steam, dew, rain, hail, snow, clouds, etc., etc. These phenomena are known.

We merely mention these facts to show how much has been discovered by human skill, but of how much more remains to be discovered we can not form the slightest notion. All that has been done in the field of science has been of actual benefit to humanity. For the discoveries are

based on fact and truth. They are ushered into this world to alleviate and to lighten the struggle and the burden of men. They come without oppression, without crime, without bloodshed. They come as the great benefactors of mankind. Men would be much better off to-day if they received for their Sunday lessons instruction in the natural, instead of wasting their precious time in repeating the silly twaddle of supernatural extravagance, that tends to stupefy instead of clearing up the understanding.

Scientific research has advanced so far, that not only are we able to know, from the discoveries made, the elementary composition of this earth, and all that belongs thereto, but other far more difficult problems have been partially solved. That is, with the aid of newly discovered instruments, we can ascertain, to a considerable extent, the elementary composition of the sun, stars, and distant planets.

In 1802 Dr. Wollaston, and later Fraunhofer, discovered and perfected an instrument called the spectroscope. It consists of a prism, fixed upon an iron stand, and a tube carrying a slit. When light passes through a slit it impinges upon a flint glass prism, by which it is dispersed. The light of burning metals has been tested in that manner. Thus when any light passes through the slit of a spectroscope, the substance giving the light may be determined, the elements burning ascertained. If the solar spectrum be examined—the light of the sun's rays—numerous dark lines parallel with the edge of the prism are observed, and reveal a number of colors giving the following: red, orange, yellow, green, blue, indigo, violet. These are intersected by fine black lines of different degrees of breadth and shade, which are always present, and always occupy the same relative position in the solar spectrum. These are called Fraunhofer's lines. By the means of this instrument, the spectra of the sun, planets, and moon have

been analyzed, and the color and position, the kind of metals these distant bodies are composed of. The sun's atmosphere, from experiments made, is known to contain metals, such as soda, iron, etc., in the condition of glowing gas, the white light proceeding from the solid or liquid strongly heated mass of the sun which lies in the interior. The metals hitherto detected in the sun's atmosphere are about fifteen or more—iron, sodium, strontium, cadmium, magnesium, calcium, chromium, nickel, barium, zinc, cobalt, manganese, aluminium, titanium, hydrogen, etc.

So delicate is this instrument that 1⁄180000000 part of a grain of sodium can be detected, and a portion of lithium weighing 1⁄6000000 part of a grain has been detected; thus showing that there exists a very strong probability that the sun, planets, and moons are composed of similar, if not the same, elements that this earth is composed of.

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[1]

Explanation.—The Roman numerals placed opposite the above list of elementary substances present the difference or equivalent or saturating power of each element. Hydrogen, for example, is a monad, a simple particle, or atom, or unit. Oxygen is a dyad, represented by II, two. It requires two atoms of hydrogen to saturate one of oxygen, or its equivalent, to form water. A triad, III, requires three monads; a tetrad, IV, four; a pentad, V, five; a sexad, VI, six units or monads, their respective equivalents or saturating power. A monad or monogenic element replaces another one by one. An atom of a polygenic element, that is, a dyad, etc., on the other hand, always takes the place of, or is equivalent to, two or more atoms of a monogenic element. ↑

[2]

Important. ↑

[3]

Exception. ↑

## CHAPTER IV.

# THE SUN.

The Colossus, or brazen statue of the Sun, was placed across the mouth of the harbor of Rhodes, its legs stretched to such a distance that a large ship under sail might easily pass between them. It was seventy cubits high, or a hundred English feet; its fingers were as long as ordinary statues, and few men with both arms could grasp one of its thumbs. Scarcely sixty years had elapsed before this work of art was thrown down by an earthquake, which broke it off at the knees, in which position it remained till the conquest of Rhodes by the Saracens (A.D. 684), when it was beaten to pieces and sold to a Jew merchant, who loaded nine hundred camels with its spoils.

Anaxagoras (500 B.C.) taught that there was but one god, and that the sun was only a fiery globe and should not be worshiped. He attempted to explain eclipses and other celestial phenomena by natural causes, saying that there is no such thing as chances, these being only names for unknown laws. For this audacity and impiety, as his countrymen considered it, he and his family were doomed to perpetual banishment. “Man,” said Protagoras of Abra (430 B.C.), “is the measure of all things.… Of the Gods I know nothing, neither whether they be nor whether they be

not; for there is much that stands in the way of knowledge, as well the obscurity of the matter as the shortness of human life."

St. John begins his writings: "In the beginning was the word, and the word was with God, and the word was God." But John, like many others of his time, knew nothing more than the use of words to make riddles, which he himself could not see through and no one else could understand. The man or men who first composed that part of scripture that informs us how the sun and earth were created, certainly knew nothing about it, because all that is at present known is of comparatively recent date. For many centuries, the established religion, the church, and the representatives of the theo-Christian organization, did all in their power to prevent light from penetrating their hidden benighted doings. They looked upon themselves as being all in all, knowing all in all—as having had everything worth knowing revealed to them by an agency no one else had access to. The ideas of their mysterious doings, of their mysterious Gods, are hidden from view in deep obscurity—like the temple of the Egyptian Isis, that bore the inscription: "I am all that is, that was, and that will be, and no mortal has lifted my veil."

The ancient writers of the scripture were full of deep, mysterious ways, and their writings of hidden meanings. Ordinary mortals were prohibited from making inquiry because the subject was considered too mysterious, and much too sacred.

Since then, many mysteries have been dissolved, or have been analyzed by the crucial test of science, and it has been discovered that there is nothing hidden except what our ignorance prevents us from knowing. We have lifted the sacred veil and looked into the temple of nature, as she is, and not as she appears. The more we search, the more we

discover, the nearer we get to the truth.

There is not the slightest reason why every man, woman, and child at proper age should not be instructed in matters wherein they are immediately interested, the knowledge whereof would undoubtedly be to their benefit.

Men have lived through centuries of fable, ages of fiction, long periods of myth. The Christian God is as much of a myth as any myth that ever existed. Humanity having passed through these various mental afflictions, gone through so many bloody surgical operations, we are, as it were, approaching a condition that will soon be declared as convalescent, and this most miserable of theological nurses may at not a very remote period be dismissed.

We can say, without the slightest conscientious scruple, or fear of contradiction, with reason to sustain us and the light of science to prove the truth, that *There is no God*.

There never was—except such a one as men have invented, held sacred, and worshiped. There is nothing sacred except what man makes sacred, nothing holy except what man makes holy, nothing divine except what man makes divine. He makes his own God, and he religiously, piously, devoutly prays to and worships it. The more regularly he does so, the more saintly he becomes, or esteems himself.

For many thousand years the Sun was worshiped, held sacred, sacrificed to, entempled, etc. As reason and understanding increased, they forsook him as a god, dismissed him as they had dismissed many gods before him. Yet the sun was by far their greatest benefactor and best friend—more than they were aware of.

The sun is 93,000,000 miles from the earth. Supposing a

railway could be built to the sun, an express train traveling day and night, at the rate of thirty miles an hour, would require 352 years to reach its destination. The light of the sun is equal to 5,563 wax candles held at a distance of one foot from the eye. The heat of the sun that we receive annually is sufficient to melt a layer of ice 180 feet thick, extending over the whole earth. Yet the sunbeam is only 1⁄300000 part as intense as it is at the surface of the sun. Moreover, the heat and light stream off into space equally in every direction. Of this vast flood, but one twenty-three-hundred-millionth part reaches the earth.

The diameter of the sun is about 860,000 miles. Its volume is 1,300,000 times that of the earth, i.e., it would take 1,300,000 earths to make a globe the size of the sun. Its mass is 750 times that of all the planets and moons in the solar system, and 300,000 times that of the earth. Its weight may be expressed in tons thus: 1,910,278,070,000,000,000,000,000,000. The density of the sun is only about one-fourth that of the earth, or 1.41 that of water, so that the weight of a body transferred from the earth to the sun would not be increased in proportion to the comparative size of the sun. The sun rotates on his axis, like a wheel, once in about 25 days.

Our astronomers tell us that the solar heat is gradually diminishing. In time the sun will cease to shine, as the earth did long since. Newcomb says that in 5,000,000 years, at the present rate, the sun will have shrunk to half its present size, and that it cannot sustain life on the earth more than 10,000,000 years longer. Of this we may be assured, there is enough heat to support life on our globe for millions of years to come.

The sun consists of a central orb, liquid or solid, of exceeding brightness, which of itself would give a continuous spectrum, or in other words which emits all

kinds of light. The sunlight is decomposed by means of the spectroscope, already alluded to, in order to discover the kind of elements it is composed of. Therefore Tyndall says: "I think we now possess knowledge sufficient to raise us to the level of one of the most remarkable generalizations of our age. It has long been supposed that the sun and planets have had a *common origin* and that hence the same substances are more or less common to them all. Can we detect the presence of any of our terrestrial substances in the sun?… I have said that the bright bands of a metal are characteristic of the metal; that we can without seeing the metal declare its name from the inspection of the bands. The bands are, so to speak, the voice of the metal declaring its presence.

"Professor Kirchhoff finds iron, calcium, magnesium, sodium, chromium, etc., in the sunlight spectrum. We know also the total amount of solar heat received by the earth in a year, and we can calculate the entire quantity of heat emitted by the sun in a year. Conceive a hollow sphere to surround the sun, its center the sun's center, and its surface at the distance of the earth from the sun. The section of the earth cut by this surface is to the whole area of the hollow sphere as 1 to 2,300,000,000; hence the quantity of solar heat intercepted by the earth is only 1⁄2300000000 of the total radiation.

"The heat emitted by the sun, if used to melt a stratum of ice applied to the sun's surface would liquefy the ice at the rate of 2,400 feet an hour. It would boil per hour 700,000 millions of cubic miles of ice-cold water. Expressed in another form, the heat given out by the sun per hour is equal to that which would be generated by the combustion of a layer of solid coal 10 feet thick entirely surrounding the sun; hence the heat emitted in a year is equal to that which would be produced by the combustion of a layer of coal 17 miles in thickness. These are the results of actual

measurements; and should greater accuracy be conferred on them by future determinations, it will not deprive them of their astonishing character. And this expenditure has been going on for ages, without our being able, in historic times, to detect the loss. When the tolling of a bell is heard at a distance, the sound of each stroke soon sinks, the sonorous vibrations are quickly wasted, and renewed strokes are necessary to maintain the sound. Like the bell,

"Die Sonne tönt nach alter weise.

"But how is its tone sustained? How is the perennial loss made good? We are apt to overlook the wonderful in the common. Possibly to many of us—and to some of the most enlightened among us—the sun appears as a fire differing from our terrestrial fires only in the magnitude and the intensity of its combustion. But what is the burning matter which can thus maintain itself? All that we know of cosmical phenomena declares our brotherhood with the sun—affirms that the same constituents enter into the composition of his mass as those already known to chemistry. But no earthly substance with which we are acquainted—no substance which the fall of meteors has landed on the earth—would be at all competent to maintain the sun's combustion. The chemical energy of such substances would be too weak, and their dissipation would be too speedy. Were the sun a solid block of coal, and were it allowed a sufficient supply of oxygen to enable it to burn at the rate necessary to produce the observed emissions, it would be utterly consumed in 5,000 years. On the other hand, to imagine it a body originally endowed with a store of heat—a hot globe now cooling—necessitates the ascription to it of qualities wholly different from those possessed by terrestrial matter. If we knew the specific heat of the sun, we could calculate its rate of cooling. Assuming this to be the same as that of water—the terrestrial substance which possesses the highest specific heat—at its

present rate of emission, the entire mass of the sun would cool down 15,000° Faht. in 5,000 years. In short, if the sun be formed of matter like our own, some means must exist of restoring to him his wasted power. The facts are so extraordinary, that the soberest hypothesis regarding them must appear wild. The sun we know rotates upon his axis; he turns like a wheel once in 25 days: can it be the friction of the periphery of this wheel against something in surrounding space which produces the light and heat? Such a notion has been entertained. But what forms the brake, and by what agency is it held, while it rubs against the sun? The action is inconceivable; but, granting the existence of the brake, we can calculate the total amount of heat which the sun could generate by such friction. We know his mass, we know his time of rotation; we know the mechanical equivalent of heat; and from these data we deduce, with certainty, that the entire force of rotation, if converted into heat, would cover more than one, but less than two, centuries of emission. There is no hypothesis involved in this calculation.

"There is another theory, which, however bold it may at first sight appear, deserves our earnest attention. I have already referred to it as the meteoric theory of the sun's heat. Solar space is peopled with ponderable objects. Kepler's celebrated statement that 'there are more comets in the heavens than fish in the ocean' refers to the fact that a small portion only of the total number of comets belong to our system, and are seen from the earth. But besides comets, and planets, and moons, a numerous class of bodies belong to our system—asteroids, which from their smallness might be regarded as cosmical atoms. Like the planets and the comets these smaller bodies obey the law of gravity, and revolve in elliptic orbits around the sun; and it is they, when they come within the earth's atmosphere, that, fired by friction, appear to us as meteors

and falling stars. On a bright night twenty minutes rarely pass at any part of the earth's surface without the appearance of at least one meteor. At certain times (the 12th of August and the 14th of November), they appear in enormous numbers. During nine hours of observation in Boston, when they were described as falling as thick as snowflakes, 240,000 meteors were calculated to have been observed. The number falling in a year might perhaps be estimated at hundreds or thousands of millions, and even these would constitute but a small portion of the total crowd of asteroids that circulate round the sun. From the phenomena of light and heat, and by the direct observation of Encke, on his comet, we learn that the universe is filled with a resisting medium, through the friction of which all the masses of our system are drawn gradually toward the sun. And though the larger planets show, in historic times, no diminution of their periods of revolution, this may not hold good for the smaller bodies. In the time required for the mean distance of the earth from the sun to alter a single yard, a small asteroid may have approached thousands of miles nearer to our luminary.

"Following up these reflections we should infer that while this immeasurable stream of ponderable matter rolls unceasingly towards the sun, it must augment in density as it approaches the center of convergence. And here the conjecture naturally rises that that weak nebulous light, of vast dimensions, which embraces the sun—the Zodiacal light—may owe its existence to these crowded meteors. However this may be, it is at least proved that the luminous phenomenon arises from matter which circulates in obedience to planetary laws; the entire mass constituting the Zodiacal light must be constantly approaching, and incessantly raining its substance down upon, the sun.

"We observe the fall of an apple and investigate the law which rules its motion. In the place of the earth we set the

sun, and in place of the apple we set the earth, and thus possess ourselves of the key to the mechanics of the heavens. We now know the connection between hight of fall, velocity, and heat at the surface of the earth. In the place of the earth let us set the sun, with 300,000 times the earth's mass, and instead of a fall of a few feet, let us take cosmical elevations; we thus obtain a means of generating heat which transcends all terrestrial power.

"It is easy to calculate both the maximum and the minimum velocity imparted by the sun's attraction to asteroids circulating round him; the maximum is generated when the body approaches the sun from an infinite distance as the *entire pull* of the sun being then expended upon it; the minimum is that velocity which would barely enable the body to revolve round the sun close to his surface. The final velocity of the former, just before striking the sun, would be 390 miles a second, that of the latter 276 miles a second. The asteroid on striking the sun with the former velocity, would develop more than 3,000 times the heat generated by the combustion of an equal asteroid of solid coal; while the shock, in the latter case, would generate heat equal to that of the combustion of upward of 4,000 such asteroids. It matters not whether the substances falling into the sun be combustible or not; their being combustible would not add sensibly to the tremendous heat produced by their mechanical collision.

"Here then we have an agency competent to restore his lost energy, and to maintain a temperature at his surface which transcends all terrestrial combustion. The very quality of the solar rays—their incomparable penetrating power—enables us to infer that the temperature of their origin must be enormous; but in the fall of asteroids we find the means of producing such a temperature. It may be contended that this showering down of matter must be accompanied by the growth of the sun in size; it is so; but the quantity

necessary to produce the observed calorific emission, even if accumulated for 4,000 years, would defy the scrutiny of our best instruments. If the earth struck the sun it would utterly vanish from perception, but the heat developed by the shock would cover the expenditure of the sun for a century.

"To the earth itself apply considerations similar to those which we have applied to the sun. Newton's theory of gravitation, which enables us, from the present form of the earth, to deduce its original state of aggregation, reveals to us, at the same time, a source of heat powerful enough to bring about the fluid state—powerful enough to fuse even worlds. It teaches us to regard the molten condition of a planet as resulting from mechanical union of cosmical masses, and thus reduces to the same homogeneous process the heat stored up in the body of the earth, and the heat emitted by the sun. Without doubt the whole surface of the sun displays an unbroken ocean of fiery fluid matter. On this ocean rests an atmosphere of flowing gas—a flame atmosphere, or photosphere. But gaseous substances, when compared with solid ones, emit, even when their temperature is very high, only a feeble and transparent light. Hence it is probable that the dazzling white light of the sun comes through the atmosphere from the more solid portions of the surface.… In conclusion, thus writes Professor Thomson: 'The source of energy from which the solar heat is derived is undoubtedly meteoric.… The principal source—perhaps the sole appreciable efficient source—is in the bodies circulating round the sun at present inside the earth's orbit seen in the sunlight by us called "Zodiacal light." The store of energy for future sunlight is at present partly dynamical—that of the motions of these bodies round the sun; and partly potential—that of their gravitation towards the sun. This latter is gradually being spent, half against the resisting medium, and half in

causing a continuous increase of the former. Each meteor thus goes on moving faster and faster, and getting nearer and nearer the center, until some time, very suddenly, it gets so much entangled in the solar atmosphere as to begin to lose its velocity. In a few seconds more it is at rest on the sun's surface, and the energy given up is vibrated across the district where it was gathered during so many ages, ultimately to penetrate as light the remotest regions of space.…

" 'The heat of rotation of the sun and planets, taken all together, would cover the solar emission for 134 years; while the heat of gravitation (that produced by falling into the sun) would cover the emission for 45,589 years. There is nothing hypothetical in these results; they follow directly and necessarily from the application of the mechanical equivalent of heat to cosmical masses.'…

"But, continues Helmholtz, though the store of our planetary system is so immense as not to be sensibly diminished by the incessant emission which has gone on during the period of man's history, and though the time which must elapse before a sensible change in the condition of our planetary system can occur is totally incapable of measurement, the inexorable laws of mechanics show that this store, which can only suffer loss, and not gain, must finally be exhausted. Shall we terrify ourselves by this thought? Men are in the habit of measuring the greatness of the universe, and the wisdom displayed in it, by the duration and the profit which it promises to their own race; but the past history of the earth shows the insignificance of the interval during which man has had his dwelling here. What the museums of Europe show us of the remains of Egypt and Assyria we gaze upon in silent wonder, and despair of being able to carry back our thoughts to a period so remote. Still, the human race must have existed and multiplied for ages before the

Pyramids could have been erected. We estimate the duration of human history at 6,000 years; but vast as this time may appear to us, what is it in comparison with the period during which the earth bore successive series of rank plants and mighty animals, but no man? Periods during which, in our own neighborhood (Kœnigsberg) the amber tree bloomed and dropped its costly gum on the earth and in the sea; when in Europe and North America groves of tropical palms flourished, in which gigantic lizards, and after them elephants, whose mighty remains are still buried in the earth, found a home. Different geologists, proceeding from different premises, have sought to estimate the length of the above period, and they set it down from one to nine million of years. The time during which the earth has generated organic beings is again small, compared with the ages during which the world was a mass of molten rocks. The experiments of Bischoff upon basalt show that for our globe to cool down from 2,000° to 200° centigrade would require 350 millions of years. And with regard to the period during which the first nebulous masses condensed, so as to form our planetary system, conjecture must entirely cease. The history of man, therefore, is but a minute ripple in the infinite ocean of time. For a much longer period than that during which he has already occupied the world, the existence of a state of inorganic nature, favorable to man's existence, seems to be secured; so that for ourselves, and for long generations after us, we have nothing to fear. But the same forces of air and water, and of the volcanic interior, which produced former geological revolutions, and buried one series of living forms after another, still act upon the earth's crust. They, rather than those distant cosmical changes of which we have spoken, will end the human race, and perhaps compel us to make way for new and more complete forms of life, as the lizard and the mammoth have given way to us and our contemporaries.

"Grand, however, and marvelous as are these questions regarding the physical constitution of the sun, they are but a portion of the wonders connected with our luminary. His relationship to life is yet to be referred to. The earth's atmosphere contains carbonic acid, and the earth's surface bears living plants; the former is the nutriment of the latter. The plant seizes the combined carbon and oxygen and tears them asunder, storing the carbon and letting the oxygen go free. By no special force, different in quality from other forces, do plants exercise this power—the real magician here is the sun. We have seen how heat is consumed in forcing asunder the atoms and molecules of solids and liquids, converting itself into potential energy, which reappears as heat when the attractions of the separated atoms are again allowed to come into play. Precisely the same considerations which we then applied to heat we have now to apply to light; for it is at the expense of the solar light that the decomposition of the carbonic acid is effected. Without the sun the reduction cannot take place, and an amount of sunlight is consumed exactly equivalent to the molecular work accomplished. Thus trees are formed, thus meadows grow, thus the flowers bloom. Let the rays fall upon the surface of sand, the sand is heated, and finally radiates away as much as it receives; let the same rays fall upon a forest, the quantity of heat given back is less than that received, for the energy of a portion of the sunbeams is invested in building up the trees. I have here a bundle of cotton which I ignite; it bursts into flame, and yields a definite amount of heat; precisely that amount of heat was abstracted from the sun in order to form that bit of cotton. This is a representative case—every tree, plant, and flower, grows and flourishes by the grace and bounty of the sun.

"But we cannot stop at vegetable life; for this is the source, mediate or immediate, of all animal life. In the animal

body vegetable substances are brought again into contact with their beloved oxygen, and they burn within as a fire burns in a grate. This is the source of all animal power; and the forces in play are the same, in kind, as those which operate in inorganic nature. *In the plant the clock is wound up, in the animal it runs down.* In the plant the atoms are separated, in the animal they recombine. And as surely as the force which moves a clock's hands is derived from the arm which winds the clock, so surely is all terrestrial power drawn from the sun. Leaving out of account the eruption of volcanoes and the ebb and flow of the tides, every mechanical action on the earth's surface, every manifestation of power, organic and inorganic, vital or physical, is produced by the sun. His warmth keeps the sea liquid, and the atmosphere a gas, and all the storms which agitate both are blown by the mechanical force of the sun. He lifts the rivers and glaciers up the mountains; and thus the cataract and avalanche shoot with an energy derived immediately from him. Thunder and lightning are also his transmuted strength. Every fire that burns and every flame that glows dispenses light and heat which originally belonged to the sun. In these days, unhappily, the news of battle is familiar to us, but every shock, and every charge, is an application or misapplication of the mechanical force of the sun. He blows the trumpet, he urges the projectile, he bursts the bomb. And remember this is not poetry, but rigid mechanical truth. He rears, as I have said, the whole vegetable world, and through it the animal; the lilies of the field are his workmanship, the verdure of the meadows, and the cattle upon a thousand hills. He forms the muscle, he urges the blood, he builds the brain. His fleetness is in the lion's foot; he springs in the panther, he soars in the eagle, he slides in the snake. He builds the forest, and hews it down, the power which raised the tree and that which wields the axe being one and the same. The clover sprouts and blossoms, and the scythe of the mower swings, by the

operation of the same force. The sun digs the ore from our mines, he rolls the iron, he rivets the plates, he boils the water, he draws the train. He not only grows the cotton, but he spins the fiber and weaves the web. There is not a hammer raised, a wheel turned, or a shuttle thrown, that is not raised, and turned, and thrown by the sun. His energy is poured freely into space, but our world is a halting-place where the energy is conditioned. Here the Proteus works his spells; the self-same essence takes a million of shapes and hues, and finally dissolves into its primitive and almost formless form. The sun comes to us as heat; he quits us as heat; and between his entrance and departure the multiform powers of our globe appear. They are all special forms of solar power—the molds into which his strength is temporarily poured, in passing from its source through infinitude.

"Presented rightly to the mind, the discoveries and generalizations of modern science constitute a poem more sublime than has yet been addressed to the intellect and imagination of man. The natural philosopher of to-day may dwell amid conceptions which beggar those of Milton. So great and grand are they, that in the contemplation of them a certain force of character is requisite to preserve us from bewilderment. Look at the integrated energies of the world —the stored power of our coal fields; our winds and rivers; our fleets, armies, and guns; what are they? They are all generated by a portion of the sun's energy, which does not amount to 1⁄2300000000th of the whole. This, in fact, is the entire fraction of the sun's force intercepted by the earth, and, in reality, we convert but a small fraction of that fraction into mechanical energy. Multiplying all our powers by millions of millions, we do not reach the sun's expenditure. And still, notwithstanding this enormous drain, in the lapse of human history we are unable to detect a diminution of his store; measured by our largest

terrestrial standards, such a reservoir of power is infinite; but it is our privilege to rise above these standards and to regard the sun himself as a speck in infinite extension—a mere drop in the universal sea. We analyze the space in which he is immersed, and which is the vehicle of his power. We pass to other systems and other suns, each pouring forth energy like our own, but still without infringement of the law, which reveals immutability in the midst of change, which recognizes incessant transference and conversion, but neither final gain nor loss. This law generalizes the aphorism of Solomon that there is nothing new under the sun, by teaching us to detect everywhere, under its infinite variety of appearances, the same primeval force. To nature nothing can be added; from nature nothing can be taken away; the sum of her energies is constant, and the utmost that man can do in the pursuit of physical truth, or in the application of physical knowledge, is to shift the constituents of the never-varying total, and out of one of them to form another. The law of conservation rigidly excludes both *creation* and *annihilation*. Waves may change into ripples, and ripples into waves—magnitude may be substituted for number, and number for magnitude —asteroids may aggregate to suns, and suns may resolve themselves into flora and fauna, and flora and fauna melt in air—the flux of power is eternally the same. It rolls in music through the ages, and all the terrestrial energy—the manifestations of life, as well as the display of phenomena, are but the modulations of the rhythm" (Tyndall Lecture XII).

# CHAPTER V.

# GENESIS—THE CREATION.

Man must pass through infancy and childhood before he reaches manhood and maturity. Races and nations also had to pass the stages of infancy and childhood, with all their mistakes, fancy, and fable. In these stages any kind of information and interpretation is readily accepted, without inquiry and without investigation, for the reason that they are not capable of either. To inquire, is the awaking of knowledge; and to investigate, requires understanding. Whatever knowledge has been acquired, that knowledge can be imparted, but no more. If it be true, it cannot be denied or contradicted; if that knowledge be not true, it will be subject to denial, controversy, and dispute, when experience has ripened the understanding. Childhood will listen to anything without contradiction. It accepts the matter as told and believes it. As years pass on, the story that once seemed so impressive and pretty, that was listened to so eagerly, loses its charm, for lack of truth. Fairy tales of past ages were abundant. Every locality had them, and was by them adorned in mystery and wonder. They were ordinarily recited with startling impressiveness. With awe places were pointed out of perhaps some strange apparition, or prodigious occurrence. All of such accounts were either deliberate inventions, or concoctions of a

prolific imagination. Early writings abound in them. The improbability of a story grows stronger the farther you go back in the history of humanity. Many of these stories were incorporated in poems, in heroic legends, in tales of the mysterious births of kings and queens, descendants of gods. And the vast majority of the writers of antiquity mix fiction and fact, the possible with the impossible. They treat on the conduct of men, their deeds and misdeeds, according to the extravagant customs of the time.

The Book called scripture writings is composed of three elements—fiction, exaggeration, and fact. The fiction consists of all that portion of the writings that relates to God and his miraculous works. The exaggeration consists of impossible doings of men, such as accounts of miracle-healers, resurrectionists, flights to heaven, etc. The facts appertain to the Jewish race actually—that they did exist as a nation, and conducted their affairs in as barbarous a fashion as their neighbors.

For nearly two thousand years Christianity has done its utmost to sustain the fiction portion as being absolutely true, and still it teaches these absurdities to be true, and anyone doubting their accuracy is liable to persecution. For every doubter of the current belief, whether in ancient or modern times, is subject to discipline of the church to which he belongs. Recently in our own city many have been subjected to a mild form of persecution for doubting. They were declared to be heretics, blasphemers, etc. I speak of such men as Dr. Newton, Dr. Briggs, and others. Yet, we must concede that every organization has a right to judge as to the qualifications of any one of its members, especially if he is an office-holder. They may reject or accept any member. But since his membership depends on whether he believes in their mode of interpreting this fiction, he must say that he believes it, and proclaim to others that it is true, though he knows it is not.

Nothing on earth has given rise to so much dispute, angry quarrel, bitter hatred and abuse, as this fiction. It has been the cause of more villainy, brutality, massacres, and bloody wars than all matters that concern humanity put together.

Science universally agrees that the biblical story has not a particle of truth in it; and the older it gets the more it suffers, the weaker it gets, and it finally must undergo complete dissipation, in the presence of the strong light of natural truth.

We have a great deal to be thankful for, to have and to enjoy the privilege, the freedom, of exercising and giving expression to opinions concerning matters that have been considered too sacred to be contradicted or criticised.

The time has come, or is coming very fast, that we shall be able to dispense with God, Christ, the Holy Ghost, and the Bible as a sacred text-book, both the Old and New Testament. In order to do this we must examine some portion of its text. We should do this for educational purposes. Every man and woman should acquire a proper amount of knowledge, to enable them to think for themselves. Every person knows, or ought to know, that priest and preacher are especially educated to keep the masses as ignorant as they can possibly keep them. It is their trade. It is their bread and butter, like that of every other trade or profession—it is their business, their function, their profit, to sustain and uphold this tottering fabric, this hollow sham, this aerial nothing, with not a truth, not even a shadow of a truth, to support it.

Chapter i, verse 1, of Genesis: “In the beginning God created heaven and earth.” Verse 2: “The earth was without form and void.”

(1) God could not have created the earth, as a planet distinct and separate by itself. This terrestrial globe belongs to a system of planets, and they are all not only dependent on one another, but all dependent on the sun for their existence.

(2) How can God create a planet, this earth? Where did he get his material from? And was it possible for God to overcome the laws of gravitation?

(3) Does it not seem strange that God, who seemed to have direct dealings with Moses, did not give him more information about it?

(4) Theologians claim that God is the architect, the designer, the first cause, the creator. Why did it take God to make this terrestrial globe six days? If he was able to make it in six days, he might as well have made it in one day, yes, one hour. If the Word was God, and God was the Word, then the Word ought to have displayed this magical art; he might have simply said, Go!

The term designer, architect, creator, implies skill, human skill, a being that has brain.

(5) As to heaven, that part that is scripturally indicated as heaven is the atmosphere.

(6) We are nowhere told where God was when he was doing all this work. Whether he was floating in space among the meteors and asteroids, or had his residence on Mars or Venus, we are not informed.

(7) This earth always had a form. A globe that revolves round its own axis, once in twenty-four hours, and round the sun besides, cannot be without form. It must necessarily have a globular form; nor was it ever void.

There is no such thing as a void in fact; it may appear so to one ignorant of natural phenomena. That was undoubtedly the case when that matter was written up.

(8) It must also be remembered that every planet in the system of the sun receives a portion of his light. The contact of the sun's rays with the elements of this earth is fatal to any such nonsensical proposition as a void.

(9) As to "the darkness on the face of the deep," that could exist only in isolated places, because of an intense fog or mist. The whole surface of the earth could not have a fog at one time. That is impossible. Wherever the sun shines there is light.

(10) "And the spirit of God moved on the face of the waters." What waters? Where? We know that only one thing in this solar system can disperse a fog; that is the sun.

Verse 3: "And God said, Let there be light, and there was light."

This is worse than childish; it is stupid.

(1) How could God have light when the sun was not made?

(2) And if the sun existed, it was silly on his part to say it.

Verse 4: "And God saw the light that it was good, and God divided the light from the darkness."

How is it possible for any sane person to believe such nonsense, when everybody with a grain of common sense knows that light and darkness depend on the sun, as day and night do?

And this is said to have constituted the *first day's work*. If any man will read it carefully he will perceive that the

composition is of a nature to entertain simple-minded people, children, who are unable to understand the ordinary phases of nature.

The *second day's work* is very droll.

Verse 6: "And God said, Let there be a firmament in the midst of the waters," etc.

Verse 7: "And God made the firmament," *and divided* the waters which were *under* the firmament and the waters which were *above* the firmament, and it was so.

Verse 8: "And called the firmament heaven."

There is not a particle of sense in this.

If the firmament is heaven, and heaven the atmosphere, we know that we cannot have any water above the firmament. We may have clouds, or a certain quantity of moisture, but no water. If the atmosphere is overloaded with moisture, that moisture is sure to return to the earth in the shape of rain or other form.

This portion is important to pious persons, that they may know where their souls go when they go to "heaven"—to the atmosphere!

Theologians and religious writers contend that this earth was in a state of aqueous solution. That is all wrong. We have not oxygen and hydrogen enough to produce such a state with. Besides, if it was in an aqueous solution what became of the sixty-two elementary substances that never enter into the composition of water? Nor can the majority of the elements be held in suspension by water. The specific gravity of the different elements cannot be suspended to please anybody. Elisha is supposed to have performed that miracle; he made an axe-head swim (2

Kings vi, 6). This same man also beheld a chariot of fire and horses of fire with which Elijah went to heaven. It seems surprising that men who claim to know something of science insist upon this miraculous supernatural work. They ought to know better. They ought to know that neither God nor man can stop the chemical action of the elements in the presence or absence of the sun's heat. They ought to know that no supernatural power can suspend nature's forces, or nature's laws. They ought to know that no spirit, whether belonging to God or not, can effect such an aqueous solution as these pious gentlemen would have us believe.

The *third day's work* is remarkable. It embraces the 9th to the 13th verses inclusive. "And God said, Let the waters under the heaven be gathered together *unto one place* and let dry land appear." Was God ignorant of the existence of more oceans than one? of the numerous seas and lakes? or was this creation a local affair near the Gulf of Persia?

There is a singular phraseology used: the first day's work is not qualified; the second day, "It was so;" on the third day, "It was so, it was good." Thus, it seems, God did not discover the quality of his work until the third day, when he has it twice—"It was so," as if in surprise, and then that "it was good," as if he lacked self-reliance, or was uncertain how the work would turn out.

Verse 11: "And let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind," etc.

It is a pertinent question, or questions:

(1) On what part of the globe were these planted?

(2) In what season of the year were they planted?

(3) Did these thrive and flourish in the absence of sunlight? and

(4) In what kind of soil and in what locality? Were these trees, grass, herbs, planted at the North Pole, equator, in a subtropical or in a mild climate? Was it winter, spring, summer, or autumn? Was it sandy soil, as in the deserts of Arabia, or hill, valley, or mountain? Or was it really somewhere in Chaldea where the story originated?

Remember, we have no sun yet.

Verse 13: "And the evening and the morning were the third day." God takes his rest during the night, like any other toiler on the surface of this terrestrial globe. He did not believe in working after proper hours. No doubt he started with sunrise and stopped at sunset, as shepherds and agriculturists usually do. And God simply suspended the natural operations and went to bed. I don't blame him. He was tired.

Then again, grass might and does grow in a season, but trees do not. It takes quite a number of seasons for trees to bear fruit. The elements that enter into their composition differ. Some have more of one element, and grow on certain soil and flourish, while others do not. Moreover, there are only certain localities on earth where the growth of any can be accomplished.

The *fourth day's work* is something prodigious:

Verse 14: "And God said, Let there be light in the firmament of the heaven" (in the eighth verse God calls the firmament heaven, but in the 14th calls it the firmament of the heaven) "to divide the day from the night; and let them be for signs and for seasons, and for days and years."

Verse 15: "And let them be for lights in the firmament of the heaven to give light upon earth: and it was so."

Verse 16: "And God made *two* great lights; the greater light to rule the day, and the lesser to rule the night: he made the *stars* also."

The inventor or the writer of these passages had not the slightest conception of what he was talking about. He spoke and wrote of the mere appearance of what he beheld daily and nightly, the sun and the moon. They could not know, in those remote ages, the important role the sun plays in the solar system, because whatever is known thereon is of very recent date. Talk of setting the sun in the firmament, 93,000,000 miles' distance from the earth, considering its bulk, weight, and condition, is an outrage on common sense. It is a monstrous piece of stupidity to make children believe it, and it is an infamous fraud for any priest or preacher to teach it.

Writers in order to explain away the above difficulty quote, for example: "Maimonides (born 1131 A.D.) in his guide, Rashi (1030) and Aben Ezra (1119) in their commentaries, hold that the light of the first day was that of the sun itself, which revolving in its sphere from west to east and from east to west made a day of twenty-four hours. The scripture's saying that it was created on the fourth day is incident to its thus demonstrating its effects upon plants, which appeared on the third day; rain, which proceeded from the exhalations and vapors raised from the earth by the action of the sun's heat thereon, being necessary to their vegetation. Therefore, it is clear that there was no new creation on the fourth day; but the heat implies that on that day the sun developed the effects of his heat on plants." This is one of many explanations of philosophical commentators who have tried to explain away the difficulty of creation, owing to the many doubts that arose

in the minds of learned men about the tenth and eleventh centuries A.D.; and especially the Greek philosophers, Aristotle[1] and others. Volumes upon volumes have been written in order to explain away the difficulties theologians encounter. As science advances, explanations and reconciliations become more difficult. Maimonides, in his pious enthusiasm, after having consulted Aristotle and others, is not quite certain, but he claims (according to More, xi, 15): "I propose to show that the creation of the world, as our religion teaches, is not impossible, and all philosophical reasonings to the effect that it is not so, as I have said, they may overthrow, but cannot make any objection against us. As for me, I stand firm in my belief on the question, of whether the world had a beginning or not. I accept the solution of this problem from the prophets, as the prophets explain these things, which speculation cannot reach," etc. (Kusari I, 65, 67). In other words, Maimonides, the authors of the Talmud, and all other writers, theological philosophers, Hebrew and Christian, prove the truth of the Bible by the Bible. One portion of scripture must prove another portion to be true. The Jews use their own biblical authorities to demonstrate one another's statements. Isaiah gives evidence for Moses, and Moses is made to testify for Isaiah, and so the Jewish philosophers whip the devil round the ring. The Christians have a double hold. They have a New Testament. They prove the statements made by persons figuring in the Old Testament by statements made in the New Testament. That is, they make Elijah, Elisha, Isaiah, Ezekiel, Moses, etc., give testimony for John, Mark, Matthew, and Luke; and then make Luke, Matthew, Mark, and John give evidence for Moses, Ezekiel, Isaiah, Elisha, Elijah, etc.

The majority of theological writings and commentaries, yes, all of them, were composed and written during the Christian era, and nearly one-half of these after the twelfth

century. All are employed with the same subject-matter. Although they lay claim that the Talmud and other works treat of mathematics, physics, medicine, etc., they knew little or nothing about these things, and the little they did know was mostly appropriated from the Greek and other nations.

It is not an unusual occurrence for modern thinkers to interpret the statements of ancient writers as they originally never intended. They spoke in enigmas, parables, simply philosophical phrases, without stating a single fact, implying nothing in particular and everything in general.

"And he made the stars also." Make the stars! We have shown in a previous chapter that this our solar system is but a speck among the starry host of the universe.

From verse 20 to 23 inclusive, God created moving creatures in the water, and fowl that may fly above the earth. This general statement, like all other statements in the Bible, is based on the principle that "with God everything is possible." Unfortunately for God's adherents, that is absolutely not the case. The laws of nature are fixed, permanent. There is no exception in favor of any mortal and natural being, and certainly not for any supernatural and imaginary being.

Does it not seem strange that the only animal mentioned in the fifth and sixth days' performance is the whale? "Great whales," it says. Why great whales? They had heard something about the whale, he therefore received prominence, and was mentioned. They had no knowledge of other animals. Or was this great whale purposely inserted to do that extraordinary service to Jonah?

And after all this work was done, God saw that it was good. Evidently pleased with his handiwork.

On the *sixth day* he finishes his work—he "brings forth living creatures." Why living creatures? Are not fish, fowl, and whales living creatures? Next come cattle and creeping things. After he created the creeping things he made man.

Verse 27: "So God created man in his own image; in the image of God created he him, male and female created he them."

If man was made in his own image, God's image, God must have the semblance of man, otherwise man would not be like him. If God has the semblance of man, and creates and desires, works and rests, like a man, he is a man, therefore cannot be supernatural—a God!

Verses 28, 29, 30: God places all that he has created at the service of man, giving him full control and dominion to make use of these benefits as he, man, thinks best. "And behold it was very good," and then God took a rest.

The entire creation must have taken place in a mild or warm climate, in some isolated locality on the face of the globe. No mention is made of icebergs, snow or hail. There does not seem to have occurred the slightest impediment in any of the work done. No evolutionary period, except the night's rest God reserved for himself, in addition to the whole day Sunday, or rather the seventh day.

We are now prepared to make some very pertinent remarks and ask some very pertinent questions:

(1) What period elapsed from the time man was created to the time man could use words or speech intelligently?

(2) We may assume that no one was present at the time of creation, because man and woman were made the last thing on the sixth day.

(3) Who was the first man that received this information? After how many generations or centuries was this news published, and to whom?

(4) We are not informed, even by the holy book, of the man's name who was the fortunate recipient of this valuable information.

(5) Is it not highly probable that the man who first told this story might also have invented it? We have no proof to the contrary, except the mere say-so of somebody.

The statement, as written, is well enough as a *fable*; that's all. As to fact, there is not a particle of truth to sustain it. But if men are determined to believe it, and are not open to conviction, if they are willfully blind to the truth, they must remain the slaves to a powerful ecclesiastical organization.

The 14th verse, however, betrays its origin. When the sun and moon were made for seasons, days, and years, as also for signs, that shows a high degree of civilization. These divisions did not take place before man was created? Were really these divisions made before a living creature inhabited this earth? For whom? For whose use? Writing had not been invented. Athates, or Hermes, the Egyptian, is supposed to be the founder of hieroglyphics, 2,136 B.C. And we do not hear of writing until 1,494 B.C. It is claimed that writing was taught to the Latins by Europa, daughter of Agenar, king of Phœnicia. The doctrine of the solar system as it is now accepted was first taught by Pythagoras of Samos about 529 B.C. Copernicus proved it in the sixteenth century, and Newton demonstrated the truth fully in the year 1695. History claims for the Egyptians that they were the first who fixed the length of the year. The Chaldeans and Persians had adopted the lunar year before Abraham ever dreamed of being exiled

by his countrymen, the Chaldeans. Can any man be so silly as to believe that an almanac was made before man was created? There is not an intelligent priest living who is ass big enough to believe any such nonsense.

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Aristotle, 343 B.C., logician and philosopher, founder of the Peripatetics. ↑

## CHAPTER VI.

# GENESIS—THE GARDEN OF EDEN.

The custom of six days' labor and one day's rest is a human invention, and is based on the principles of economy, power-saving, labor-saving, and had been a recognized institution long before the date of the supposed creation. For if the statement of Baily be true (and we have no right to discredit it), human beings have existed, in one state or another, above 4,000,000 years. The record of the Hebrew race is insignificant in comparison.

The modern eight-hour movement is the outcome of the economic reforms of labor. Had the composers of the scripture known something of it at that time God might have worked only eight hours instead of from sunrise to sunset.

We cannot have the slightest doubt that the above first-given labor regulation existed long, long ago. The Chaldeans had their mode of government, their laws, their social rules and regulations; other neighboring nations had theirs; it was therefore nothing new. This six days' labor clause was incorporated, but there was no need of a God to make it.

Verse 4: “And these are the generations of the heavens and of the earth, when they were created, in the day that the Lord God made the earth and the heavens.” What generations of heaven?

Verse 7: “And the Lord God [In this chapter an extra title is assigned to God—it is the Lord God! Why?] formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul.”

This is a very grave error. Man is not made of dust of the ground. There is comparatively very little dust in his composition.

(1) Man contains no more dust than any other animal; the proportion of inorganic constituents in him and other animals is about the same.

(2) Animals are constructed anatomically and physiologically the same. They have the same organs, the same number of muscles, and same number of bones, with some few exceptions. They are built on the same general principles as man; or rather, as man came later, we will say that man is constructed on the same general principles as the animals.

(3) The same mechanism and functions are to be found in the one as in the other—respiration, circulation, digestion, etc.

(4) The proportion of mineral matters contained in a man —or dust, as it is termed in scripture—is about 1⁄23 to 1⁄24 of the bodily weight. That is, a body weighing about 125 to 130 pounds would yield about 4½ to 5 pounds of dust, or rather ashes, and the largest proportion of these ashes comes from the solid framework, the skeleton, the bones, composed of phosphates and carbonate of lime.

(5) More than two-thirds of the body's weight is water—that is, hydrogen and oxygen. The principal elements found in the body are oxygen, hydrogen, nitrogen, carbon. There are traces of sulphur, etc., besides the mineral substances above alluded to. Thus man is not made of dust, but of water, oxygen and hydrogen, nitrogen and carbon. If they had made God say that he made man out of water, he would have been much nearer the truth. Solomon repeats the same in his Eccles. iii, 20: "All go unto one place; all are of dust, and all turn to dust again." In the burial service the same absurdity is repeated. Alter your service, your prayer—put water in place of dust. Or better, give all the four elements a chance.

Do not teach children we are made out of dust. It is not true. Teach the young what is true. What is the good of lying because some man said, God said so?

The "breath of life." Is it not time that men of intelligence, in this age of progress and civilization we boast so much of, cease to pretend to believe such nonsense? It is absurd to talk of its being "parables" and "figures of speech." Either the text means what it says, or it means nothing.

There has been an immense amount of controversy over two Hebrew words, viz.: *nephesh*—breath, respiring, life, life strength, animal soul; *ruach—anamos*, breath, wind, *psyche*, soul, spirit, etc. They thought that the life is in the blood. Lev. xvii, 11: "For the life of the flesh is in the blood." Gen. ix, 4, 5: "But the flesh with the life thereof, which is the blood thereof," etc., etc. This controversy has given rise to no end of studies, as psychology—derived from the word *psyche*,—soul. The literature that has been expended on this subject, *psyche*, soul, cannot be easily estimated. The matter has been twisted into a science, discussed, argued, lectured on, etc. On the word *Theo*, *Theon—Deos*—God, societies and sects, etc., have been

formed, as the Theosophists.

What is the breath of life that caused so much controversy, in church and out of church? *Oxygen.* Deprive a man of oxygen and he dies. Deprive a beast of oxygen and it dies. Oxygen thus is essential to life. Neither man nor beast, as we said, can live without it. The issues which this has given rise to are bewildering—theological, metaphysical, Theosophical, philosophical, Agnostic, gnostic, spiritual, etc., etc. Oxygen, however, covers the ground. It represents all, so far as the life of a body is concerned.

We now come to *Paradise, or the garden of Eden*.

We will try to locate this garden of Eden geographically, as nearly as possible correctly. Verse 8: "And the Lord God planted a garden eastward of Eden; and there he put the man whom he had formed." That was very kind of God. Verse 9: "God planted the tree of life also in the midst of the garden, and the tree of *knowledge* of good and evil." A wonderful tree surety. What is most to be regretted is that the species has become extinct. What a boon to humanity if but one tree were planted in every church. Verse 10: "And a river went out of Eden to water the garden; and from thence it parted, and became into four heads." Verse 11: "The name of the first is *Pison*; that is it which compasseth the whole land of *Havilah*, where there is *gold*." Verse 12: "And the gold of that land is good; there is *bdellium* and the *onyx stone*." Verse 13: "And the name of the second river is *Gihon*: the same is it that compasseth the whole land of *Ethiopia*." Verse 14: "And the name of the third river is *Hiddekel*; that is it which goeth toward the east of *Assyria*. And the fourth river is *Euphrates*."

*Assyria* was founded about 2247 B.C. and is situated near the Persian gulf; and seems to be wedged in between the

Persian empire on the east, Arabia on the west, or Badien el Arab, and on the southern point the gulf of Persia.

*Ethiopia* comprises Nubia, Sennaar, and Northern Abyssinia, and takes in a stretch of country on the west shore of the Red sea. The two countries are separated by the Red sea, and by Arabia, which extends from the east shores of the Red sea to the west shores of the Gulf of Persia, and Assyria. Some one made a big blunder, or Johnston's atlas is wrong, or they—God—made a mistake in the name. There is considerable distance between the two countries. Assyria lies in Asia and Ethiopia in Africa. Egypt lies farthest north of what is usually known as Ethiopia. Assyria is hemmed in, north by Armenia, west by Media and Susiana, south and southeast by Babylon and Mesopotamia. The river Tigris is the dividing line on the south and southeast. The Parachoatras and Zagrus mountains form the dividing line on the western border, and Armenia is the boundary on the north.

*Chaldea* is, comparatively speaking, a small tract of land situated between the river Euphrates and the Arabian desert, or Badien el Arab, with Babylon on its north and the Gulf of Persia on the southwestern point.

The river Euphrates takes its rise in the Gulf of Persia and runs westward, and divides into four branches.

The *first* branch, the Pasitigris, runs somewhat westward through Susiana; the *second*, Chaosper or Kirkhah, runs northward through Susiana; the *third*, the river Tigris, runs north, northwest, separating Babylon from Susiana by Assyria; the *fourth*, the river Euphrates, the farthest south, runs westward, etc.

This is the only river near the Gulf of Persia that divides into four branches, and these are the four rivers that are

indicated where the garden of Eden was planted. This is near enough geographically to locate this garden which the Lord God planted. It will indeed afford great pleasure for pious people to know whereabouts they can find the garden of Eden. In this rapid-transit age, they can get an excursion ticket and reach this Paradise in a few weeks. This garden was planted in Chaldea.

We will now see what God did next.

Verse 15: “And the Lord God took the man, and put him into the garden of Eden to dress it and keep it.” God gave the position of gardener to Mr. Adam. The only stipulation in the contract between the Lord God and Adam was (verses 16, 17), he could eat of every tree in the garden except the tree of knowledge. There is a God for you—wants to keep the man he made in his own image, a living soul, as ignorant and as stupid as possible; in addition tempting him to commit a wrong act.

Verse 18: “And the Lord God said, It is not good that the man should be alone; I will make him a help meet for him.” Very considerate indeed on the part of God.

Verse 21: “And the Lord God caused a deep sleep to fall upon Adam, and he slept; and he took one of his ribs and closed up the flesh thereof.” This is the cleverest kind of surgical operation that was ever performed, without loss of blood, use of antiseptics or anesthetics, without ligature, etc. And out of this rib he made a woman. Why did God make a man of dust and the woman out of the man’s rib? Why did he breathe into the nostrils of the man and forget to do it to the woman? The only reasonable explanation that can be given is that, in those days, among the Chaldeans, woman was considered an inferior creature, possessing no soul. She was the slave sometimes, but the servant always. She was the creature of man’s lust, of his

passion, and she was placed in the Bible by the man that wrote it in just the position and condition she occupied at that period. This is a gross falsehood, it is debasing, it is an infamous libel on truth. Does any woman believe that she is a bone of her husband's bone, and flesh of his flesh?

Verse 25: "And they were both naked, the man and his wife, and were not ashamed." What is there extraordinary about that? Savage races up to this present time are found in many instances nude. Cæsar describes the Germans as bathing promiscuously in a nude state. Columbus found our American Indians nude. Evidently a degree of civilization had already been attained when this story was evolved. The story had its origin in the romantic regions of Chaldea, somewhere in the neighborhood of the Persian gulf, near the river Euphrates. The singer, the story-teller, or the traveling minstrel tramped from place to place, from one shepherd's tent to another, relating the story to his crude, barbarous countrymen, reciting the curious yet pretty fable of how man was made; the world made; the garden made; how gold, onyx, and bdellium were found, and where; lauding and glorifying their own country, and making out that they were the immediate descendants of the gods.

Every nation has its fairy tales, its fables, its myths, its songs, and its romances. Whether they have their origin in Egypt, or come down embellished from Mount Olympus, whether they are the fairy tales of the Rhine, or those from the river Euphrates in Chaldea, they are only the products of imagination.

"They spring from fountains and from sacred groves,
And holy streams that flow into the sea" (Od. x, 350).

Next we come to chapter iii—the childish account of the serpent, and the woman and the fruit she ate. The serpent is

made to say, verse 5: “For God doth know that in the day ye eat thereof, then your eyes shall be opened, and ye shall be as gods, knowing good from evil.”

The first knowledge they acquired was, that they discovered they were without clothes. “And they sewed fig leaves together and made themselves aprons.” Why sewed? With what? Aprons were a very late invention, and were never intended for any such purpose. And then, the conversation between the Lord God and Adam! God calls for Adam while he is hiding. God inquires with a Chinese simplicity, “Where art thou?” This is the blandest kind of conversation that has ever taken place between mortal man and a God. Adam tells him that he has eaten some fruit. Like the boy who had stolen jam out of the jar, it seems Adam could not lie. God grows petulant, angry, cross; scolds him, and immediately deprives him of his position and turns him out of the garden. God had two reasons for doing what he did. One reason was to punish Adam for disobedience; the second, that God got afraid of Adam.

Verse 22: “And the Lord God said, Behold the man is become as one of *us*” (were there more gods than one?), “to know good and evil; and now, lest he put forth his hand; and take also of the tree of life, and eat, and live forever”—— Was it the fear of competition—that men might interfere with God’s occupation, infringe on his monopoly?

It seems to have a priestly ring, this forbidding and preventing ordinary mortals to become intelligent. The story is so framed as to express the line of conduct of the higher towards the lower, of the slave towards his master, of the laborer towards his lord; and the 19th verse expresses the subjugation of the poor ignorant creature: “In the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken; for dust thou

art, and unto dust shalt thou return." It is the church and the priest that have taken care to keep the dust in the eyes of the masses. They are the cherubim with a flaming sword that keep the masses away from the tree of life.

Chapter iv relates to the crime of murder. God instigates the crime. Abel kept sheep. Cain tilled the ground. Cain brought vegetables to God, and Abel brought the firstlings of his flock and *fat*. God's taste ran in the meat line; he was somewhat of an epicurean. He respected Abel and his offering, but did not respect Cain's. Then God asks Cain why he is cross, and after Cain kills his brother Abel, he, God, says: Where is thy brother Abel? And God dispossesses Cain and drives him east of Eden to Arabia. A very arbitrary landlord this God.

Chapter v: The fourth chapter winds up with Enos the son of Seth. Verse 26: "Then began men to call upon the name of the Lord." Now, Adam lived 930 years, Seth 912 years, and Enos 905 years. God during this period was wholly occupied with these people. Murder is the only incident of importance during the first thousand years. God takes a long rest for nearly 2,000 years before anything of importance occurs.

This chapter treats of the genealogy, age, and death of the patriarchs from Adam to Noah.

The records of creation are by no means harmonious. There are no less than one hundred and twenty opinions on the subject. The difference between the latest and remotest dates is no less than 3,268 years. Here are some of the dates of the supposed creation of the world. They may be interesting to some, as showing the uncertainty and inaccuracy:

| | |
|---|---|
| Hebrew, | 4004 B.C. |
| Septuagint, | 5873 ” |
| Talmudistic, | 5344 ” |
| Scaliger, | 3950 ” |
| Petovias, | 3984 ” |
| Dr. Hale, | 5411 ” |
| | etc. |

Here we give the genealogy of Adam and his line:

| **Age.** | | | |
|---|---|---|---|
| 930 | Adam, | Born 4004 B.C. | Died 3074 B.C. |
| | Abel, | | 3875 ” |
| 912 | Seth, | 3874 ” | ” |
| 905 | Enos, | 37691 ” | ” |
| 910 | Cainon, | 3679 ” | ” |

| | | | |
|---|---|---|---|
| 895 | Mahaloled, | | |
| | | 3609 | ” |
| | | | ” |
| 962 | Jared, | | |
| | | 3544 | ” |
| | | | ” |
| 815 | Enos, | | |
| | | 3282 | ” |
| | | | ” |
| 969 | Methuselah, | | |
| | | 3317 | ” |
| | | | ” |
| 777 | Lamech, | | |
| | | 3130 | ” |
| | | | ” |
| 365 | Enoch, | | (Translated?) |
| | | 3017 | ” |
| | | | ” |
| 815 | Noah, | | 500 bef. |
| | | 2948 | ” flood. } |
| | | | ” |
| | | | 315 aft. |
| | | | ” |

We may venture to make a very strong interrogation mark after these years. They are, however, in harmony with the rest of the story. Noah closes the fabulous period. We hear no more of God’s doings until we come to Abraham, 1921 B.C. And Abraham reached the age of 175 years only.

Chapter vi, on the sons of God, etc., is next. I beg to remind the reader we are still in Chaldea, near the Gulf of Persia; near the river Euphrates; near the garden of Eden,

where God created man; where we found gold and precious stones; the place where murder was committed; near Arabia, etc. The geographical location is important, and let the reader also remember that the whole tract of land where all these transactions are supposed to have taken place is not so large as any moderate-sized state in our Union.

If you will examine a map of this particular region, it will help to bring the truth to your mind, and add considerably to your understanding. It is also well to bear in mind that in this small territory the art of agriculture was pursued, as well as fruit-growing, sewing was invented and aprons were made, and Eve had an apron before she had a dress, and this high state of civilization existed as soon as man and woman appeared on earth! What a contrast with other barbaric, savage, and uncivilized tribes! Eve had a decided advantage over the young female that was captured when Columbus landed December 12th. She was perfectly naked; so says history.

Verse 2: “The sons of God saw the daughters of men, that they were fair; and they took them wives all which they chose.”

Sons of God! Was God married? If so, to whom? How many wives had he? How many sons and daughters? Where was God’s residence, if he had any? Were his domestic relations pleasant or not? Was his family large or small? Pray give us some information. Our theologians will tell us, “Ah, that has a spiritual meaning.”

Verse 3: “And the Lord [not God] said: My spirit shall not always strive with man, for that he also is *flesh*.” Who?—God? “Yet his days shall be a hundred and twenty.” This is a crafty statement, because it shows that the average length of life was the same as it is now, with some few

exceptions, and as the fabulous age was past, the only way to get out of the difficulty was to give timely notice that extraordinary ages should not occur again.

Verse 4: "There were giants in the earth in those days; and also after that, when the sons of God came in unto the daughters of men, and they bore children to them, the same became mighty men which were of old, men of renown." Who were these descendants of God that became mighty and men of renown?

After God's sons intermarry with the daughters of men, the affairs of man grow worse, instead of better. And God grows despondent:

Verse 5: "And God saw that the wickedness of man was great in the earth, and that every *imagination* of the thoughts of his *heart* was only evil continually."

Think of *God's sons* causing all this wickedness on earth. He ought to have brought them up better. What can we expect of a God that cannot raise his own children properly?

"*Every imagination of the thoughts of his heart.*" This exhibits the profound ignorance of God. Though he made man, he did not know what the various organs in the body were for. He ought to have known that the heart does not think. Its function is to circulate the blood—a truth which was not discovered until 1618 by Harvey, of England.

Verse 6: "And it repented the Lord that he had made man on earth, and it grieved him at his *heart*."

Ha! God has a *heart*, and he has *flesh*, and he has *sons*; he knows what is *good*, *evil*, *wickedness*; *repents* and *grieves*; and has domestic relations with—evidently ladies, by

whom he has children.

We will not mind the preparations of the ark, or the shipbuilding instructions given by God. A God that knew something of mechanics, shipbuilding, dimensions, measurement, etc.—no wonder theologians call God a designer, an architect. He showed some skill in the construction of this boat.

As soon as Noah had everything prepared, had loaded his cattle, etc., food and provender, God was ready to destroy his own sons and their relations by drowning them.

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Weights and measures were invented about this period. ↑

# CHAPTER VII.

# THE DELUGE.

As to the region where the deluge occurred—on the northern edge ascend the Persian mountains; on the east the steep and lofty parallel chains of the Indo-Persian boundary mountains, and on the south the plateau for a thousand miles along the Persian gulf and Arabian sea is bounded by the wild terraced regions of Beloochistan and Faristan. The second division includes the mountainous regions of Armenia, Koordistan, and Azerbijan. Here the table-land is compressed about half its general width. From this plateau, of which a part is mentioned in scripture as the "mountains of Ararat," rises the volcanic cone commonly styled Mount Ararat, to the hight of 17,212 feet above the sea level.

The highlands of Syria rise gradually from the neighboring desert to the hight of 10,000 feet in Libanus and Antilibanus, and slope steeply in terraces down to the narrow coastlands of Phœnicia and Palestine.

Of the Syrian and Arabian lowlands, the south is hot and arid, with almost no oasis; but the north is watered by the Tigris and Euphrates.

Near this isolated corner of Asia, in the neighborhood of the Persian gulf and the rivers Euphrates and Tigris, where the deluge is supposed to have occurred, in the lowlands of that region, Chaldea, immense chains of mountains run in several directions, with highlands 10,000 feet above the level of the sea.

Verse 4: “For yet seven days, and I will cause it to rain upon the earth forty days and forty nights; and every living substance that I have made will I destroy from off the face of the earth.”

This deluge is supposed to have taken place about 2348 B.C. Hale puts it at 3154 B.C. The sons of God came upon earth and married the daughters of men about 2948 B.C.; about this date ought to be nearer the flood. Noah was 600 years old when he floated in his ark.

We will consider, first, a *general deluge*.

A deluge over the whole earth is an impossibility.

1. We have to take in consideration the inequality of the earth’s surface—lowlands, highlands, hills and mountains, plateaus, etc.

As to mountains: Asia possesses no less than sixty or seventy mountains, the highest being some 29,000 feet above the sea’s level—the Himalaya, Everest.

Africa boasts of some thirty or forty mountains, the Kenia and Killamandja being 20,000 feet above the level of the sea, the other mountains grading downward in hight.

Europe is adorned with some seventy or eighty mountains, Mount Blanc being the highest, others ranging downwards.

South America boasts of some forty or more mountains,

the Tupengater being the highest, 22,450 feet above the level of the sea.

North America counts some seventy or more mountains, Mt. Elias being 17,900 above the level of the sea.

We have plateaus and table-lands ranging from 10,000 feet above the level of the sea downward to near the sea's level.

The great basins between the highest points of the earth's surface are filled with water. These immense expanses form oceans, seas, lakes, rivers. The ocean bed is just as uneven as the dry portion of the earth's surface. The numerous islands are the mountains of the ocean bed, some of greater, others of lesser extent.

2. The fluid part of the terrestrial globe fills the hollow places of the solid portion of the earth's crust. These are the great and small depressions, or greater and smaller basins.

3. The earth's weight has always been the same, neither increased nor diminished. This includes both the solid and liquid part of this terrestrial globe.

4. The fluid portion of this terrestrial globe has neither increased nor diminished. It cannot, because the quantity of oxygen and hydrogen is limited to this earth. None can get away, and none can come to it.

5. Water may change its position, or state—split up into elements; make clouds, mist, hail, snow, or rain, or dew—but it ultimately returns to the great basin of water where it came from.

6. If water rises in any one locality beyond the ordinary sea level, water has diminished in some other locality. The quantity of water on the earth's surface has not increased,

except in one locality.

7. Rain cannot fall over the whole surface of this earth at one time.

8. There is always daylight and sunshine, night and darkness, on this earth.

9. Heat and cold vary in the different parts of this earth. The atmosphere is different in the various parts of the earth's surface. There is a perpetual winter, summer, spring, or autumn in various parts on this globe.

10. The rays of the sun strike the various portions of the earth at different times. This variation in the direction of the sun's rays produces a corresponding variation in the intensity of the sun's heat and light at different places, and accounts for the difference between the torrid and the frigid regions, etc.

11. The atmosphere does not, and cannot, carry beyond a certain percentage of aqueous vapor. When it becomes overcharged the moisture must fall, in raindrops when the temperature is warm enough.

12. The sun's heat regulates the amount of aqueous vapor the atmosphere can carry in the form of clouds. When the atmosphere is fully saturated, rain must fall.

13. When the atmosphere is cool or cold, the raindrops congeal, and we have snow or hail.

14. There are regions on the earth where it never rains, probably never rained. The rainless region of Asia is of vast extent. It includes part of Tibet, the great desert of Gobi, and part of Mongolia—a space estimated to comprise about 2,000,000 square miles. There are other rainless regions on the face of the earth's surface. There is

a great diversity in the yearly amount of rainfall; the highest is about 60 inches, the lowest 21 and less.

15. There is no great difference between the polar and equatorial diameter of the earth, the average number of miles being about 8,000.

Taking the above facts in consideration—the conformation of the earth's surface, the elevation above the sea level, table-lands or plateaus, and mountains, the fixed quantity of water upon the surface of the earth, the influence of heat and cold, the condition of the atmosphere, etc., a general deluge must be rigidly excluded.

Supposing it rained forty days and forty nights, how many inches of rainfall could we possibly get? We can know to an inch the quantity of rain that would fall. The water would certainly roll down the hills and mountains, fill up the lakes and rivers, overflow the banks, and rise in the lowlands to a certain hight.

The deluge, Noah's deluge, was a local affair, if it ever occurred. Granting such a flood did take place, it never extended beyond that portion of Asia, Chaldea. Supposing that the rivers Tigris and Euphrates may have overflowed and caused a flood say of fifty feet rise above the level of the sea (which is impossible, because the surplus waters would flow into the seas and oceans), how insignificant is the rise of fifty feet even in comparison with table-lands 10,000 feet above the sea-level, and mountains 20 to 30,000 feet above the sea-level.

As to the extent of the rainstorm that caused this deluge, I do not suppose that the clouds held in the atmosphere extended over 500, or say 1,000, square miles over the region where the rain fell.

As to collecting the animals for the ark from all over the globe, that is just as ridiculous as the deluge itself.

It is to be presumed that the person or persons who wrote the first seven chapters of the Bible had not the slightest idea of the geographical condition of the earth's surface. It was not known. They thought that their locality embraced the whole earth. Even in Columbus's time they had no idea of the extent of this earth. The seas that they probably had some knowledge of may have been the Gulf of Persia, the Red sea, the Mediterranean or Arabian sea, probably the Caspian. That was about the extent. They had means neither of land travel nor of navigation.

Verse 20: "Fifteen cubits upward did the water prevail, and the mountains were covered."

A cubit, standard, contains 21 inches. Fifteen multiplied by 21 gives 315 inches, or 26 feet 3 inches. How can 26 feet 3 inches of water cover plateaus 10,000 feet high and mountains like the Ida, 4,000 feet, and the Himalayas 29,000 feet in height? Mount Ararat in Asia Minor is 17,112 feet high.

These are figures. They do not lie. We have here positive proof. I defy contradiction. Every man and woman with a little sense can prove it. And any priest or clergyman that will maintain the truth of a general deluge after reading this statement, is either a fool, or a fraud and an infamous liar.

In fact, the entire rainfall during the forty days and nights would have had as much effect on this globe as a pint of water would have to drown an elephant.

Verse 21: "And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every

creeping thing that creepeth upon the earth, and every man."

Verse 22: "All in whose nostrils was the breath of life, all that was on dry land, died."

Verse 23: "And every living substance was destroyed, which was upon the face of the ground, both man and cattle and the creeping things, and the fowl of the heaven; and they were destroyed from the earth; and Noah only remained alive, and they that were with him in the ark."

Verse 24: "And the waters prevailed upon the earth a hundred and fifty days."

Mount Ararat is situated in Persia about 150 to 200 miles south of the Black sea, and about 300 miles west of the Caspian sea, about 500 miles east of Aleppo and the Mediterranean sea, and about 700 miles north of the Gulf of Persia, from Mount Sinai about 1,000 or more miles northeast, and a similar distance from the Red sea.

Arabia is about 700 miles across between the Persian gulf and the Red sea. The distance between the shores of the Persian gulf and the Caspian sea is about five hundred miles.

The Caspian chain of mountains are situated about two hundred miles north of Mount Ararat, and they extend from the Sea of Azof north, running southwest to the Caspian sea.

The entire tract of territory where this deluge is said to have occurred does not embrace one thousand miles in any given direction, and takes in but two countries—Turkey and Persia—and only a portion of either. It does not extend farther north than the Caspian mountains and the Black

sea, east than the Mediterranean sea, west than the Caspian sea, and south than the Persian gulf and Arabia.

Turkistan, Afghanistan, and Beloochistan form the eastern boundary of Persia.

The twenty-six feet three inches of the rise of water in consequence of the rain could not have extended beyond the limits indicated above.

At the period of the deluge there were immense countries east of Turkistan, Afghanistan, and Beloochistan—Russia north, the Chinese empire and Hindostan farthest south. Europe and Africa could not be reached. So that all living substance was not destroyed and could not be destroyed. Nor was all living substance destroyed in the country where the flood occurred, because those living on high table-lands were out of reach of the flood.

We must necessarily draw our own conclusions as to the truth or falsity of the statements contained in verses 21, 22, 23. Some destruction of life may have taken place, limited to the locality.

There are other evidences that go to show the incorrectness of the scripture. The Hindoo era, or the era of the Caleyung, dates 3001 B.C., seven hundred and fifty-six years before the deluge. This country was flourishing at the time of the flood. Moreover, the Hindoos counted their months by the progress of the sun through the Zodiacs.

Keep the figures of the deluge in mind, 2348 B.C.

China, north of Hindostan and east of the deluged territory, was flourishing 2700 B.C. It was not touched by the flood. It had its own floods, separate and distinct from Noah's.

In 2347 B.C., one year after the flood, Noah made wine

from grapes.

| | |
|---|---|
| Babylon was founded by Belus | 2245 B.C. |
| Astronomical observations were made | 2234 B.C. |
| Bricks were made | 2247 B.C. |
| Babylon was built | 2247 B.C. |

All this region was in a state of civilization one hundred years later, when all men had been destroyed, and the region had been under water twenty-six feet three inches for one hundred and fifty days. One hundred years seems a long time, and a great deal can be done, that's true. In those days civilization was exceedingly slow. People did not progress so rapidly as we do in this New World. There are regions where hardly any progress has been made. They are at a standstill, as it is termed. The people live, feed, and die.

The inconsistency, the untruth, of the story of the deluge will be palpable to everyone, if he or she will take the trouble to examine the geographical, physical, and historical facts.

I especially call the attention of hysterical, fanatical theologians, supernaturalists, and the whole priestly class, to the declaration that God had nothing to do with this deluge; that the God in whom they believe must be an ass to think that he can drown out the whole terrestrial globe with forty days and nights' rain, with a rise of water of twenty-six feet three inches.

It is impossible to enter into every detail in this brief statement. There is, however, ample proof that a general deluge never occurred, and that all animals, whether men or beasts, were never destroyed.

How much honor it would reflect for a convention of clergymen, or a gathering of archbishops in saintly conclave assembled, to solemnly declare the whole beginning of Genesis a fabrication, a fiction, a fable—that God had nothing to do with any such performance; that God could not do anything so foolish; that God never did anything contrary to the laws of nature; that neither God nor man could, if they wished, do anything contrary to the laws of nature. And that "We, the archbishops, bishops, and clergy in general, further declare and aver, that we, the sacred representatives of the ignorant masses, no longer believe that God, the so-called father almighty, created either heaven or earth, or beast or man, or anything; that we repudiate, deny, and reject all of the statements made in the book called the Bible; that we do not believe in any supernatural interference; that we have erred and have misinstructed and misguided the masses; that the whole story is false, frivolous, and incredible; that neither the creation, as recited, nor the deluge, or any part thereof, as described, is true."

## CHAPTER VIII.

# THE SCRIPTURAL GOD—THE CREATION.

The Chaldeans were undoubtedly great admirers of nature at the time we first hear the name of Abraham mentioned in connection with the Bible, about the year 1921 B.C.

The people had already arrived at a high degree of civilization. The country belonged to the Assyrian empire under Ninus the Jupiter, 2069 B.C. How long this section of country had been populated, and its inhabitants under a proper form of government, we have no record—in all probability, for many centuries.

The Chaldeans had already invented a judicial astrology, which was transmitted to the Egyptians, Greeks, and Romans. The science of astronomy was known to them, and of it there are records as early as 2234 B.C. The science of arithmetic was used by them—in all probability invented by them; concerning it we have nothing recorded. The kingdom of Babylon existed 2245 B.C. An art of architecture of some kind was already in use among its people, as we see from the fact that they had built important structures. We have no records as to the

proficiency they had arrived at in any other branch of science or art. That the art of writing was known to them is probable, otherwise they could not have recorded certain facts about astronomy. The credit of first using hieroglyphics, 2212 B.C., is given to Athates, or Hermes, the Egyptian.

The correct division of the days of the week, the months, and the seasons may probably have been known to them, though the Jews take the credit.

That these Chaldeans were great observers will not be disputed—otherwise they could not have discovered the fixed stars, planetary system, etc. That they must have had considerable intellectual qualities—perceptive powers and skill in reasoning—developed will be admitted, inasmuch as they were the inventors of astrology, and of what more we have no knowledge.

They were great admirers of nature. We may infer that from the fact that they were students of astronomy, acute and close observers of nature.

What myths or fables they had, we have at the present time no idea. We have no historical knowledge of these people. We know very little of their manners, culture, science, arts, degree of civilization.

Other events occurred about that period. A Phœnician colony under Partholani landed in Ireland 2048 B.C.

In 2207 B.C. the government of China was established—it had an imperial dynasty. Fohi was the Chinese monarch.

In 2089 B.C. Sicyon was king of Greece.

In 2188 B.C. Egypt was established.

In 2085 B.C. Egypt was conquered by the shepherd kings of Phœnicia.

In 1998 B.C. Ching Hong teaches the Chinese the art of husbandry, and the method of making bread from wheat and wine from rice.

In 2095 B.C. pyramids and canals in Egypt. The science of geometry begins to be cultivated.

In 2100 B.C. sculpture and painting are employed to commemorate the exploits of Asymandyas.

We have no difficulty in arriving at a conclusion that considerable progress had been made in the art of government, in the political and social world, in the arts and sciences, and also in the moral and religious departments of life.

As to whatever myths and fables they had, of their origin we know very little, or I may say nothing. The story of the creation and the deluge is in all probability native to the soil. The deluge was in all likelihood a local affair—an overflow of the river Euphrates or the Gulf of Persia. Whether it rained forty days and nights or more, water enough could not fall to the ground to do any serious damage, beyond the locality where it occurred. It would be not amiss even for the most pious, God-fearing man to understand that the rainwater that falls to the surface of the earth was originally taken from the waters that are found on the surface of the earth. The actual quantity of water on the earth was no more after the flood, or after any flood, than before. The water changes position from one locality to another; it does not increase or diminish in quantity, whether it consolidates, evaporates, or liquefies. Whatever elementary form it may assume, the law of gravitation holds its elements down to mother earth.

The idea entertained by many theologians, that the whole earth was covered with water, is absurd. We have not water enough on the surface of this earth to serve any such purpose. This problem is just as feasible as trying to drown a man in two inches of water—attempting to cover the entire earth with the water that is upon it.

From historical evidence we gather that the people that inhabited this region occupied their time chiefly with raising cattle, and were prone both to the observation of nature and to superstition.

The nervous system had at this time undergone considerable training and culture. Their faculties were already developed. They discussed and reasoned about current subjects, especially about those subjects which were nearest and dearest to them—religion and politics. And we are still discussing the same subjects with as much eagerness, acrimony, and hate as these Chaldean shepherds did.

They were adorers of nature, which was perfectly in harmony with their occupation. The beauties, the phases, the phenomena of nature, these they could not explain. Ignorant of their character and composition, not understanding the natural, they reasoned themselves into conclusions that there must be a power beyond that sets all these things in motion.

They knew nothing of God. In all probability they created nothing new, but may have modified whatever was handed down to them by their fore-fathers—notions, customs, well-outlined rules of conduct, observances, policy, government, etc.

The wiser and best-instructed portion of the community selected those things that to them were most beneficial, and

for which they thought they ought to be grateful—in their wonderment and admiration they made selection of that which was to them most striking—and this gradually led to a systematization of certain qualities, certain excellences.

All things in nature are object-teachers. When we have seen a thing several times, we know it—learn its qualities, etc. So the forefathers of the Chaldeans, admiring nature, came to recognizing what was best, either in themselves or round about them.

In order to present these ideas, powers, and excellences in the most striking manner to the senses, symbolic representations, or typical forms, were made, about in the same or similar manner as playthings are made to instruct and amuse children.

All the idols and mythological gods are drawn from nature, associated and endowed with such qualities as the human beings had from time to time attained.

The motives that suggested these were just as pure as any motives are now.

We have symbols and idols among us at this day, four thousand years later. It makes no difference whether it is Christ on a stick, the Virgin Mary on a canvas, or the sacred heart of a saint, it amounts to precisely the same thing; it is object-teaching—an object-lesson.

These Chaldeans had any number of symbols and idols, and men were assigned to watch and guard them. They had their ceremonies, their gowns or priestly garbs; they had their places for worship, out of doors or indoors—everything that gave beauty, dignity, and sanctity to their performances. In short, we may conclude that they had what may be called an established religion, with

ceremonies, sacrifices, idols, as well as social, moral, and political rules to govern them.

There was dissension in those days as there is now. Men differed, argued, discussed; and differences arose. New ideas were intolerated then, as they are now. The old would not yield to the new. Wrangling, anger, passion, jealousy, led to new formations, antagonistic to the old. The old systems had in all probability grown corrupt, domineering, cruel, selfish, and rapacious. A reformation of some kind was in order. Men of ability and sagacity began to grow skeptical as regards the quality and ability of these numerous idols. Something similar is agitating the world to-day. Doubtless it is always to be found.

Abraham was an agitator, a reformer, if you will. Josephus thus speaks of him (Chap. VII): “He was a person of great sagacity, both for understanding all things and persuading his hearers, and not mistaken in his opinions; for which reason he began to have higher notions of virtue than others had, and he determined to renew and to change the opinions all men happened then to have concerning God; for he was the first that ventured to publish this notion: That there was but one God, the creator of the universe; and that as to other (gods) if they contributed anything to the happiness of men, each of them afforded it only according to his appointment, and not of their own power. His opinion was derived from the irregular phenomena that were visible both at land and sea, as well as those that happened to the sun and moon and all the heavenly bodies. ‘If,’ said he, ‘these bodies had power of their own, they would certainly take care of their own regular motions; but since they do not preserve such regularity, they make it plain, that so far as they coöperate to our advantage, they do it not of their own abilities; but as they are subservient to him that commands them, to whom alone we ought justly to offer our honor and thanksgiving.’ For which

doctrines when the Chaldeans, and the people of Mesopotamia, raised a tumult against him, he thought fit to leave that country."

In other words, he was driven from his country for sedition and heresy, when he was seventy-five years old. He settled down in a land called Canaan, where he built an altar, and performed a sacrifice to God.

In this manner Abraham began to cultivate a reformation and religion among his own people, who were quite numerous.

The Egyptians at this period were in a flourishing condition. Canaan was invaded by famine. So Abraham went down to Egypt, "both to partake of the plenty they enjoyed, and to become an auditor for their priests, and to know what they said concerning the gods; designing either to follow them, if they had better notions than he, or convert them to a better way, if his own notions proved the truer."

At this time, too, much dissension, quarrel, and antagonism existed between the religious orders, and Abraham was not going to lose such an excellent opportunity. Josephus describes the condition of affairs as follows: "For whereas the Egyptians were formerly addicted to different customs, and despised one another's sacred and accustomed rites, and were very angry one with another on that account, Abraham conferred with each of them, and confuting the reasoning they made use of, every one for their own practices, he demonstrated that such reasoning was vain and void of truth; whereupon he was admired by them in those conferences, as a very wise man and of great sagacity when he discoursed on any subject he undertook; and this not only in understanding it, but in persuading other men also to assent to him. He communicated to them

arithmetic, and delivered to them the science of astronomy," etc.

Finding perhaps that he could not make proselytes he returned to Canaan. He there divided the tract of land between himself and Lot, each one pursuing his own particular course, Abraham with his notions and Lot with his, unable to agree.

An incident worthy of notice occurred. The Assyrians made war on a number of kings, the Sodomites and Lot among them. The Assyrians conquered, and Lot, among the rest, was made captive. Abraham, with three hundred and eighteen men, pursued the Assyrians, slew them, captured all they had, and gained a signal victory—thus showing that Abraham was a power.

Lot's affairs with his daughters we pass over, since they have no special interest for us.

Abraham had several wives or women, by whom he had a number of children. He had six sons by Katurah, Ishmael by Hagar, Isaac by Sarah, etc.

None of the sons adopted his method of thinking except Isaac, who at the age of twenty-five was to have been sacrificed to God. Isaac, being a mild-mannered young man, generous, and obedient to his father's will, readily consented. Upon that, Abraham changed his mind. Isaac then became the heir both of his property and of his ideas concerning God.

Abraham had two brothers, Nahor and Haron. Haron left a son, Lot, and two daughters, Sarai and Milcha. Nahor married Milcha and Abraham married Sarai. In this manner the family concentration began. And when Isaac was forty it was decided that he should marry the

granddaughter of his brother Nahor, Rebeka, the sister of Laban.

Isaac in turn made choice of Jacob as heir to his ideas and property—who took flight on account of Esau, and landed safely at his uncle Laban's house in Mesopotamia. Jacob married Laban's daughters, Leah and Rachel, as well as their handmaids, Zilpha and Bilhah. Now, Laban and his family were idolators. So were Esau and his family. Rachel took along with her the images of the gods which, according to their laws, they used to worship in their own country, etc. Jacob raised his children strict to the rules laid down by his grandfather and father; and the views as regards the rites of worship and circumcision, as well as God in the abstract with all the carnal passions and emotions of man that formerly were the attributes of the idols, as also the sacrifices.

The story of Joseph is too well known to be repeated. It is quite enough for our purpose that a famine drove this Jacob's family, as it did Abraham, to Egypt, where they increased and multiplied during a period of nearly four hundred years; that Joseph was famous in the land, and the king gave Jacob and his children leave to live in Heliopolis —for in that city the king's shepherds had their pasturage.

This in brief is the story, stripped of the peculiar phraseology, which no doubt was in those days customary.

The trouble had begun with Terah, Abraham's father, who hated the Chaldeans; and the Chaldeans returned the same with interest, I suppose. So they moved to Haran in Canaan and settled down on a tract of land, by the right of squatter sovereignty, as it would be called in our times. Terah, the first squatter, turned this land over as a heritage to his son, Abraham; Abraham to Isaac, and Isaac to Jacob. In this manner it became the promised land, the heritage of their

fathers.

It is no easy matter to suppress and eradicate a practice, a habit, a custom, once firmly ingrafted in a community. Prohibit it as much as you will, it will be done secretly. So after circumcising the Hamerites and Shechemites, the sons of Jacob slaughtered them, on account of the seduction of Dinah, Jacob's daughter. He and his family had to leave for fear of their neighbors, so Jacob told his household to put away the strange gods that were among them, and "be clean and change your garments," he said (Gen. xxxv, 2).

This abstract idea of God that Abraham called into life was not so firmly rooted as might have been expected. The taint of the ancient gods more or less remained among them and occasionally cropped up here and there in a most prominent manner. For four hundred years we hear nothing of God or his workings—whether the Jews flourished or were oppressed—nor have the other descendants ever made mention. Abraham, Isaac, and Jacob call on this imaginary god when in an emergency, when some task has to be accomplished, some journey has to be undertaken, or a battle has to be fought.

During the whole of the period they were in Egypt, notwithstanding they were sorely oppressed, this God paid no attention to them, until a man arose that produced a great crisis in the affairs of this people, in the destiny of this family which had grown into a nation. This was really the first reformation—that is, modification—of the existing religious practices—their numerous gods, perhaps their rites, etc. The sacrifices the Jews retained, with most of the usages and priestly rituals.

How many reformations or modifications had taken place before Abraham the reformer, we do not know; and how

long these gods (they were very numerous) were in existence we know still less.

The evolution of these idols, the existing gods, did not take place all of a sudden. It may have taken thousands of years for anything we know. It required considerable mental training to produce them. Intelligence had assumed some importance, because the people had become proficient in argument, skillful in reasoning, and observers of nature.

The ordinary barbarian possesses no such capabilities. His brain is not sufficiently cultured. So long as his wants are amply supplied, there is no necessity to exert himself, the nervous system lies inactive, and this inactivity involves the perpetuation of ignorance.

We may reasonably presume that these Chaldeans, these shepherds, had through many centuries of slow culture acquired the knowledge they possessed, the customs and habits they practiced, the laws they promulgated, and the rules of conduct enacted both for social and political purposes.

And any innovation on the established laws was resisted and punished, pretty much as it is to-day. So when Abraham, or Terah his father before him, started the reformation, it caused a good deal of commotion and alarm. The upholders of the settled state of affairs were shocked. Anger, passion, partisanship, ran their course then, as they do now. These idolators were just as intolerant then as Christians are to-day. It was either submit or leave. Thus Abraham's and Terah's leaving the land of their fathers and settling on a tract of land where they could cultivate their new idea, their new God, was without any special act, without miracle, without supernaturalism, without mystery, perfectly human, perfectly natural.

## CHAPTER IX.

# THE CREATION OF GOD—ABRAHAM.

God, such God as we know of now, like all other things and beings on this terrestrial globe was evolved very, very slowly in the minds of man—crude, ill-shapen, ill-fashioned, grotesque, barbarous, savage, semi-civilized: harmonizing with his existing mental condition and all his surroundings; a product of man's rudeness, of his uncultured nature, his inexperienced special senses, with his nervous system just emerging from an instinctive animal life to a grade or two above its former intelligence—the first step towards real humanity.

God was not always presented to humanity in his present guise. Oh, no; everyone with a moderate degree of intelligence who chooses to examine the records will find that God has undergone vast and important changes—changes in tendencies and character, conforming with the progressive or retrogressive forms of political and social life of the various communities, corresponding with the periods of the time in which they lived.

The idea, in its primary conception, was slowly evolved,

without special meaning or signification, dark, mysterious, incomprehensible. We may say, however, that this idea of God was endowed with characteristics best known to men, but of a higher quality than ordinarily then existing; largely reflecting their makers, an embodiment of their own powers and capabilities.

There was a time, no matter how remote, when there were creatures resembling the present form of man but of inferior nervous development, that had no knowledge of either God or religion.

Nor had man in those ages any more intelligence than he had acquired by experience, or was necessary for his immediate use. It improved as the exigencies of his wants arose, fresh experience leading to new observations, slowly adding to the already accumulated stock.

The intelligence of to-day would have been useless a hundred years ago, to the same race even, and of less use still two hundred years ago, and so on.

It is very doubtful whether man at first was even conscious of his own existence, any more than the higher type of brute life. This consciousness slowly dawned upon him as his intelligence increased. A child is not conscious of its own existence. It exists so long as the necessary material is contributed towards its existence, or until it has grown strong enough to contribute towards its own. It may after a while acquire intelligence sufficient to become conscious of its own existence or not. The same rule holds good among the types of man such as we find on earth at the present time.

During the early stages of man's existence, the muscular powers were exercised most, we may say almost exclusively, the special senses serving in their function as a

guide for those powers, with the degree of intelligence obtained from the number of impressions received. These senses had acquired their several experiences from the necessities that from time to time were made manifest.

There are writers who make use of extraordinary expressions in regard to nature, as for example, that Nature is mighty, beautiful, wise, etc.

Nature is mighty only under certain conditions. Peculiar combinations of elements are essential. The presence or absence of the sun's heat plays always an important part.

Nature's being beautiful depends largely upon the education of the senses, the capability of discerning symmetry, harmony, color, etc., and this is acquired by comparison, taste, and habit. What strikes one eye as beautiful, may have just a contrary effect on another, or be passed with perfect indifference by a third.

As to wisdom, nature can be wise only through a cultured, well-educated, evenly balanced mind. The expression is applicable only to man. Wisdom is a particular quality eminently and evidently the product of a highly trained nervous system.

It is not an easy task at the present time to unravel the mental process of the earliest races of man that first led to the formation and the adoption of the idea that something existed more potent and more powerful than themselves.

Yet if we carefully examine the mental condition of some of the wild, barbarous nations existing at the present time, we may infer, with a reasonable degree of accuracy, the mental process the earliest races of man were capable of.

Races or tribes, no matter how low in the scale of

civilization, that were perfectly secure in their possessions, amply provided by nature against the encroachments of other races, man or animals, existed right along perfectly content, exerting themselves just enough to gather in those substances which they found contributive to the sustenance of their lives. The surplus time was spent in gamboling, frisking, playing, amusing themselves in their primitive condition like children of nature as they were. Progress they made none. There was no occasion for it. Their senses were exercised to the extent of their immediate wants and no more. The natural head of the family or tribe was the oldest, the father. He controlled or governed his descendants. So long as the father was able to exercise his supreme power he was the recognized head, adviser, leader, etc. While in this condition, the primitive customs, habits, or usages practiced in their natural mode of living began, and continued with very few changes for ages.

Their *language* was as simple and crude as their mode of life, just sufficient for their wants. This mode of communication originated mainly from the necessities of life, as hunger, danger, pleasure, protection, surprise, fear, etc. For all these they found expressions, sounds that conveyed the notions to one another, quite intelligible among themselves. They adopted names for things and beings with which they came in contact in their daily lives, and for such instruments, utensils, and clothing as they from time to time invented or discovered by accident. The sounds that expressed their immediate necessity of communicating with one another, their wants—the cries of call, pain, etc.—had no form in particular, no grammatical construction, no rules. Their emotions and passions were limited, because they knew no wants, no conflicts, other than those that arise from feelings inspired by their five senses. And they really had language enough for all purposes—suitable and ample for their condition in life.

*Arts and sciences* they had none. Their simple domestic arrangements were as primitive as they were. Their furniture consisted of little or nothing. Cooking utensils they needed none. There was no occasion to cook; nature's food was ample. This they collected, selected, and fed upon.

*Clothing* they had no use for, in the warm climate they lived in. They were clad in nature's garb, male and female alike. Innocence and virtue was well understood among them. They were moral in their way, committed no wrong —there was no occasion for it. There was plenty for everyone. The larders of nature were free, open, and plentiful. Therefore all were satisfied and happy.

*Wealth* or *property* they had. All they surveyed was theirs. What belonged to one belonged to the other. Mine and thine was unknown. The more civilized qualifications of property right developed many centuries later.

*Commerce* they knew nothing of. There was no need for that, since furniture, utensils, implements of agriculture, weapons, clothing of any kind, they had no use for.

*They had no laws*—nor law-makers, nor justices, nor judges, nor any officials known in later times.

And what is more, they had no God, or idol, or myth, or symbol, or worship, or prayer or religion, or soul, or spirit. Nor did they know anything about what we indicate by the epithets *physical* or *metaphysical*, neither *theological* nor *psychological*, neither *gnostic* nor *agnostic*.

They did not know of any of those things. These were evolved and invented later, as the necessities and exigencies arose, as their wants increased, and circumstances changed from internal to external

conditions.

Consequently, their language was limited. They made use of a limited number of words, or produced articulate sound enough to express just what they wanted, and no more. They may have had two or three hundred different words or sounds in use. We have men to-day among us that have not many more words at command, and their ideas generally correspond in number and quality to their stock of words.

The stock of words and the stock of ideas always depend upon the amount of experience and the amount of exercise the *five senses* have had; together with the urgencies and difficulties they have had to contend with. The power of observation is developed in accordance as the opportunities arise.

Each particular special sense develops its own faculties, from the practice, use, and experience of that sense, the role it is called upon to play as necessities arise. And as each object is perceived or observed by the special sense, it is recorded, a picture of the same is retained in the great nervous storehouse for future reference. The retention and recognition of the same goes to the formation of memory. As the stock of objects increases, words or sounds designating the same also increase in number, and the material for the formation of ideas is also largely increased.

Ideas can be formed only about such things as we know, or rather such things as any one special sense has been impressed with, has perceived and recognized. Those things or beings by which any one sense has not been impressed, the mind neither has perceived nor is able to recognize. Everyone, whether barbarian or civilized, is perfectly familiar with those things or beings that

immediately surround him—that is, all those things and beings which the senses have already been impressed with, perceived and recognized. Sounds, or words, have been invented to designate all such; and these are known; the picture representing any one object is retained, stored away in the great nervous storehouse, the brain—are remembered. The oftener a thing is perceived, the more familiar it becomes and the more easily recognized, the firmer it becomes fixed and the more easily it is recollected.

Thus primitive man, with his few wants, and these wants amply supplied by nature, had or invented names for all of them. These formed the earliest collection of names of objects—their appearance, their actions, their habits, etc. All these qualities were associated, identified, and presented by words, in due time, without the presence of the objects. That is to say, the simplest ideas were in this manner formed, and the ideas so formed corresponded with the number of words, and the number of words corresponded with the number of impressions received by the senses.

Each sense presents its share—one sense more, another less. A person may have received a large number of impressions on the organ of vision—a painter, for instance—and may have stored away a wealth of artistic knowledge, yet the sense of hearing may be exceedingly poor in the number of impressions received. Such an individual would be rich in artistic ideas but comparatively poor in musical ideas. So it is with all the special senses.

Each sense receives impressions on its own account. It has its own special nervous center, and these special centers again are closely connected with the great mass of brain matter. Collectively they have for their function, to receive impressions, retain them, store them away, recollect them,

and reproduce them by articulate sound, or to recognize them.

In this process then we have the formation of idea, memory, thought; recollection is the endeavor to call back, or form a figure of, an object once already perceived—felt by the senses.

## CHAPTER X.

# MOSES.—THE CONFIRMATION OF THE IDEA OF GOD.

We will here sketch the military career of Moses.

We omit the early incidents of the life of Moses—his childhood, his growth, his education—and begin with his active life.

"And the occasion he laid hold of was this: The Ethiopians, who are next neighbors to the Egyptians, made an inroad into their country, which they seized upon, and carried off the effects of the Egyptians, who in their rage, fought against them, and revenged the affronts they had received from them; but being overcome in battle some of them were slain, and the rest ran away in a shameful manner, and by that means saved themselves, whereupon the Ethiopians followed after them in the pursuit, and thinking that it would be an act of cowardice if they did not subdue all Egypt, they went on to subdue the rest with greater vehemence; and when they had tasted the sweets of the country, they never left off the prosecution of the war; and as the nearest parts had not courage enough at first to fight with them, they proceeded as far as Memphis, and the

sea itself, while not one of the cities was able to oppose them. The Egyptians, under this sad oppression, betook themselves to their oracles and prophecies" (Josephus, Ch. X).

Moses thereupon was appointed general of the Egyptian army against the Ethiopians, and conquered them in the following manner:

"But Moses prevented the enemies, and took and led his army, before those enemies were apprised of his attacking them; for he did not march by the river, but by land, where he gave a wonderful demonstration of his sagacity; for when the ground was difficult to be passed over, because of the multitude of serpents, which it produces in vast numbers, and indeed is singular in some of these productions, which other countries do not breed, … When he had therefore proceeded thus on his journey he came upon the Ethiopians before they expected him; and joining battle with them, he beat them, and deprived them of the hopes they had of success against the Egyptians, and went on in overturning their cities, and indeed made great slaughter of these Ethiopians. Now when the Egyptian army had once tasted of this prosperous success by the means of Moses, they did not slacken their diligence, insomuch that the Ethiopians were in danger of being reduced to slavery, and all sorts of destruction. And at length they retired to Saba, which was the royal city of Ethiopia, which Cambyses afterwards named Meroe, after the name of his own sister. This place was to be besieged with very great difficulty, since it was both compassed by the Nile quite round, and the other rivers Astapus and Astaboms made it a very difficult thing for such as attempted to pass over them; for the city was situate in a retired place, and was inhabited after the manner of an island, being encompassed by a strong wall, and having the rivers to guard them from their enemies, and having great

ramparts between the wall and the rivers, insomuch, that when the waters come with the greatest violence, it can never be drowned; which ramparts make it next to impossible for even such as are gotten over the rivers to take the city. However, while Moses was uneasy at the army's lying idle (for the enemies durst not come to battle), an accident happened: Tharbis was the daughter of the king of the Ethiopians; she happened to see Moses as he led his army near the walls, and fought with good courage, and admiring the subtlety of his undertakings, she believed him to be the author of the Egyptians' success, when they had before despaired of recovering their liberty, and to be the occasion of the great danger the Ethiopians were in, when they had before boasted of their great achievements, she fell deeply in love with him; and upon the prevalency of that passion, sent to him the most faithful of all her servants to discourse with him upon their marriage. He thereupon accepted the offer on condition she would procure the delivering up of the city; and gave her the assurance of an oath to take her to be his wife, and that when he had once taken possession of the city, he would not break his oath to her. No sooner was the agreement made, but it took effect immediately; and when Moses had cut off the Ethiopians, he gave thanks to God, and consummated his marriage, and led the Egyptians back to their own land" (Josephus, Chap. V.)

These are simple facts, wherein God plays no part. It is a human transaction, a conflict of forces; the strongest and most skillful wins. And when the last place of refuge, the fortress, is besieged, and the Ethiopians are thoroughly beaten, the place seeming impregnable, the army discouraged, a woman, the king's daughter, betrays it, and Moses is victorious. Thermutis, his mother by adoption, raised him and educated him after the manner of princes. He was a great favorite. Her influence gave him not only

her protection, advice, and information, but other great advantages such as no other being could obtain, she being constantly at court and a sister to the king.

It was no small glory, as well as experience, he reaped. That conquest made him the first man in the land. That jealousies, antagonism and hatred were engendered against him by his rivals, that conspiracies were formed, may readily be imagined, and that finally his life was threatened. Finding it rather dangerous to remain in the country, since he was being closely watched, and all the roads were guarded, and being no doubt fully informed of the plot, Moses fled. “He took flight through the deserts, where his enemies could not suspect he would travel; though he was destitute of food, he went on, and despised that difficulty courageously” (Jos.).

Moses was born in 1571 B.C., and was made general of the Egyptian army when he was about thirty-five or thirty-seven years of age. In 1531 B.C. he fled from Egypt and arrived at Midian. He made the acquaintance of a priest named Raguel or Jethro—his future father-in-law, for he married Zipporah, Jethro’s daughter.

Aaron, his brother, three years older, being born 1574 B.C., must have been a man of considerable influence. He remained during Moses’s absence in Egypt. The exodus of the Israelites from Egypt took place in 1491.

Daring his forty years’ stay with Jethro he minded his cattle near Mount Sinai, where many supposed wonders are related to have occurred.

That Moses was not idle is self-evident. A man of that particular type could not remain inactive. What took place between him and Aaron or between him and Thermutis his stepmother is not recorded in history. That some

systematic organization did take place is very probable. That all followed in the ordinary course of human events, is to be presumed. And that the plans were laid and matured, how these people were to be molded into a nation, and in what manner they were to leave Egypt, we cannot have a reasonable doubt.

It is more than likely that after the successful conquest, he was fired with the ambition to become a ruler himself. Envy and jealousy prevented his ever assuming the crown of Egypt, but what was to hinder him becoming the head and leader of his own people? In his solitary wanderings about Mount Sinai, he was inspired with the thought of delivering his own people, especially as the Pharaoh, his former protector, was dead. Having all the necessary material at hand in court and out of court, he proceeded to carry out his plans.

Moses was the man who *created Jehova*. Ex. vi, 3: "And I appeared unto Abraham and Isaac, and unto Jacob by the name of God almighty; but by my name *Jehova* was I not known to them." Not likely! Abraham, Isaac, and Jacob were of little or no culture. They were herdsmen who simply differed from their neighbors by substituting an imaginary God for the numerous images and idols that were then in fashion. They had not the remotest idea of the meaning of the God they worshiped, such as Moses now put into the word God. It was no longer a mere abstract copy with him—a thing to dispute, to reason, to argue about. To Moses it became a stern reality. The brain, the nervous system, the senses, the faculties, had undergone a revolution during the four hundred years. Moses, with all the scholastic advantages, raised and educated to rule and govern man and nations, ambitious for power, a great general, a man of determination and force, a man that was capable of plotting against plotters, conspiring against conspirators, who deliberately and shrewdly went to work

to organize his people—he conceived then the idea that the simple old-fashioned Adonay—Lord—had lost its importance, being a common-place, every-day God among the Hebrews. He invented the unpronounceable *Jehova*. It makes little difference whence it is derived, whether from Io, Jovis, Jupiter, etc.

Jehova and Mount Sinai are inseparable. Moses knew every stone and crag about that mountain. A man does not live near a mountain, especially a man of great vigor, action, and intellect, but that he observes every nook, every spot, every footpath, and every turn. The conception of Jehova originated at Mount Sinai; and later the power, the establishing and the realization, of his ambition, of his Jehova, took place.

The miraculous pretensions and the wonderful workings that appear in the scriptural phraseology were no doubt necessary for the purpose of carrying out the scheme Moses had concocted. In modern times we can regard it only as a very peculiar method of writing up a history.

Moses had his emissaries and leaders among his people. When they were told about the wonderful occurrences about Mount Sinai, and what the *Great Jehova* said to Moses, the story was rehearsed and repeated—about the promised land, their preservation, their liberty. Of course, what could they do otherwise than yield? Their hopes were elated, and they were really interested, and believed that the God of their forefathers had sent Moses as their deliverer.

Moses had already their confidence by his past history. The hero, the great conqueror of the Ethiopians, the savior of Egypt—that alone was an immense prestige. But when it was announced that the Jehova, the Lord God, etc., had said this and that to him, that he commanded him to do this

and that, where is the miracle, where is the wonder, that they obeyed?

When Moses found that the Hebrews would be obedient to whatsoever he should direct, as they promised to be, and were in love with liberty, he began his negotiations with the king of Egypt, who had but lately received the government.

As to his contest with the Egyptian priests in performing their respective tricks, called miracles, what wonder that these ignorant creatures believed, when we find stupid people enough of all nations that believe in the miraculous cures of an old rag, purporting to have belonged to Christ or some one else? Whatever was done, and how it was done, we shall never know. That there was nothing supernatural about the transaction is absolutely certain. The people may have believed it to be supernatural, as many millions believe to this day. You may believe a circle to be square, but that does not make it so. The untutored brain is surprised at a trifle, astonished at what it does not understand, and regards every new trick as a miracle.

Neither Abraham, Isaac, nor Jacob could perform miracles. They had no use for them, knew nothing of them, and really had not the talent to produce them. Miracles had not been invented, or become the fashion.

Moses was undoubtedly a proficient master of the magic arts, and accomplished his purpose thereby. After all, those performances were simply a side-show. He knew the strength of his people. A general of his capacity does not undertake a task of that magnitude without calculating the convincing force to back his demands. Six hundred thousand men on foot—besides children and women—organized under leaders, and no doubt equipped and ready

for any emergency—an army of that size means a revolution of no small importance to a state. To avert greater danger, Egypt let them go.

Henceforth Moses is the imperial master of the situation, the dictator, the ruler, the lawgiver, as determined as he is imperious—"I am the Lord thy God." And the man Moses knew what he was talking about, and the class of people he was talking to. He was the organizer of the nation, the creator of Jehova, the intimate of God. No other man throughout the Bible before or after Moses pretended to talk with God face to face except Moses. And Moses alone shall come near the Lord (Ex. xxiv, 2). And he took every care that no other man should discover his secret workings. "I am that I am;" that is Moses. "Thus shalt thou say unto the children of Israel, I AM hath sent me unto you" (Ex. iii, 14). Who but a man accustomed to command and be obeyed would dare use such language?

Moses was fully familiar with the locality; and Mount Sinai, where he developed his scheme, he would permit no one to approach. "Take heed to yourself that ye go not up into the mount, or touch the border of it; whosoever toucheth the mount shall be surely put to death" (Ex. xix, 12). He would brook no nonsense. He kept these poor ignoramuses in constant terror, in constant dread, of his Jehova. These precautions were used, and terrible things threatened, so that no one should intrude upon his privacy on the mountain, and no doubt were necessary in order to secure his success.

We have no clear account of the manner in which these people left Egypt. The population must have numbered close upon three millions. This is entirely omitted. What God said to Moses, and Moses said to God, is continually repeated, but historical facts are wanting. We learn one important fact, however—they did not leave poor. When

they departed from Egypt this multitude had to be kept busy, otherwise they would lose confidence in Jehova and in Moses, and relapse into making images.

What kind of a God was this Jehova? In Ex. xxxi we find him giving directions about working in brass, silver, gold, furniture, designating who should work at it; but God himself turns stone-mason—in verse 18 we find two tables of Testimony, tables of stone, written by the finger of God. If God had a finger, he had a whole hand. If he had one hand he may have had two. To write needs practice, sight, brain, and all other parts belonging to a man. No doubt, when the tables, etc., were written, it was done by a man.

As to the Ten Commandments, they were not new with Moses. They were a codification of Chaldean and Egyptian laws.

The day of rest was recognized long ago in those slave-making days. It was a principle of economy, power-saving. Six of the Commandments are natural laws and are instinctively obeyed even among lower animals. All other laws were adopted from recognized customs and usages of the people, mostly taken from the Egyptians, with some few alterations, perhaps, suitable to the existing emergency.

When this Republic was founded, there were actually no new laws made, but old laws modified to suit our case; thus the Constitution was framed. Moses did precisely the same thing. The laws were the recognized habits, practices, customs, laws, usages, long established among the nations in that region. And God, or Jehova, had as much to do with the framing of them as he had with the Constitution of this nation.

Leviticus may be truly called the cookery-book of Jehova.

Just think of it, that God himself told them what to select and how to cook it. They were instructed to forsake the idols or the images of God, but retained the grosser barbaric practices of sacrificing. The detailed account given of the bill of fare is interesting. For a full description we beg to refer the reader to Leviticus.

Human nature was strong in Moses. He did what any man high in the affairs of a state would do. He installed his own relations into office—first his own tribe, the Levites. These were immediately installed as a permanent bureaucracy, as well as aristocracy. They were the rulers, lawmakers, preachers, doctors, etc. (Num. i, 47, *et seq.*). His brother Aaron and his sons were at once installed in the permanent offices. A hereditary aristocracy was established and consecrated as priests of the nation (Lev. viii). And the tribe of Levi were also selected to minister unto the priests, Aaron and sons.

The actions of this supposed God are very curious, and even amusing. He assumes so many shades of color, character, and passion, just as a man would under various degrees of excitement, disappointment, and discontent. "Whenever Moses found it necessary to act with promptness and resolution he found it convenient to use his Lord God, Jehova, and usually with excellent effect. But when Korah, Dathan, and Abiram rebel Moses gives God advice (Num. xvi, 15). "And Moses was very wroth, and said unto the Lord: Respect not thou their offering." He at once suppresses the rebellion with a strong hand and puts an end to it.

Wipe out of the biblical story the dust and cob-webs of superstition and ignorance, cleanse it of the mire and dirt of barbarism, and you find in Moses a man of action, sagacity, and determination; skillful in the arts of war; a man of great will power, energy, and pluck, breaking down

all barriers, overcoming all obstacles, conquering all difficulties, in order to secure the final success of his immense undertaking; the creator of Jehova, the great I AM, the maker of God, the leader of a great army, the organizer of a nation, the lawmaker, the lawgiver, the molder and master mind of this great work.

His stratagem to preserve the Egyptian army from serpents by filling baskets with ibises, who devour and destroy serpents, is an instance of his foresight, leading his army safely through the swamps without damage, during the war with the Ethiopians.

The great feature of Moses's Mount Sinai expedition, and his absence for forty days, and the production of the Ten Commandments, keeps the theological world in a constant stew of wonder and admiration. From the point of reason, common sense, and the light we have now, there is nothing remarkable or wonderful about the forty days' absence or the Ten Commandments. Moses was provided with all the food he needed, and all the assistance he needed, during his stay in the mountain. His own family, as well as his wife's relatives, knew all about the mountain, while the masses were kept at a respectful distance, on penalty of death.

What are these Ten Commandments?

1. One God (the concentrated essence of the Chaldean gods), worship him only.
2. Have no other God, image, etc.
3. Don't swear by God.

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4. Rest on the seventh day (economy of muscular forces).
5. Honor thy parents.
6. Do not commit murder.
7. Do not commit adultery.
8. Do not steal.
9. Do not bear false witness.
10. Do not desire another man's property.

} Natural laws of self-preservation and self-protection.

All these laws had been in existence centuries before the coming of Moses. Nations had already adopted them, as a matter of necessity. Crimes of murder and robbery, etc., were familiar among the Chaldeans and other nations. When Isaac sent messengers to Nahor in order to secure Rebeka for his wife, they had to pass through Mesopotamia, "in which it was tedious traveling, both in winter, for a depth of clay, and in summer for a want of water; and besides this, for the robberies there committed" (Jos.).

It must be remembered that society had reached a degree of organization and civilization; that these fundamental principles, these natural laws, are observed to a considerable extent even among the lower animals, and that they were strictly enforced in every barbarian as well as more civilized community. In the codification of these laws by Moses there is nothing wonderful, nothing miraculous, supernatural. The whole matter consisted in the adoption of these fundamental principles, these

common-law usages, and the proclaiming of them as the laws to govern this newly organized nation, as all other nations had done centuries before them.

The laws incorporated in the book of Leviticus, etc., consisting in the regulation or government of the nation, appointing communities or families, dealing with food, dress, sacrifice, crime and its punishment, trade, commerce, domestic affairs, marriage, and above all church affairs, were mostly adoptions from other nations with certain modifications, written up in the manner we find them.

The supernatural phenomena recited in the Bible in the books of Moses—what descended from heaven, clouds, pillars, earthquakes, thunder, lightning, rain, deluge, fire, etc., on and about Mount Sinai—and that God performed these wonders to oblige Moses, because he exercised his influence in prayer upon Jehova—form the greatest piece of nonsense that ever was written.

Clouds belong to the earth, are composed of earthly elements, are taken from the surface of the earth by a natural process and return to the earth by a natural process. Neither God nor man can influence them. The same may be said of all other phenomena. Water cannot be composed from any other elements than oxygen and hydrogen, and the silly theological twaddle cannot change it. What we ought to know is, at least something of the natural. The more we know of the natural the less we believe of the supernatural—in fact, the latter has largely disappeared. In time, let us hope, these childish delusions will be regarded as some of the remnants of the past and infantile ages of humanity.

In all ages and at all times, men of great merit have been admired and honored by mankind. But the mythology and

theology that enshrouds ancient heroes, the deification, the supernaturalism, the sanctity, the holiness, and the delusions that accompany and surround their actions, are entirely superfluous. We have outgrown these fables. And truly, these imaginary attributions, these visionary productions, have outlived their usefulness. Whether it be Moses, David, Alexander, Hannibal, Cæsar, Charlemagne, Cromwell, Frederick the Great, Napoleon, or Washington, they were men, nothing but men, and their actions, as also the great good resulting from their actions, that benefited humanity, were natural, not influenced in any way or shape by the smallest particle of supernaturalism.

Josephus speaking of Moses says: "He was one that exceeded all men that ever were in understanding, and made the best use of what understanding suggested to him. He had a very grateful way of speaking and addressing himself to the multitude. As to his other qualifications, he had such a full command of his passions, as if he hardly had any such in his soul, and only knew them by their names, as rather perceiving them in other men than himself. He was also such a general of an army as was seldom seen, as well as such a prophet as was never known, and this to such a degree that whatsoever he pronounced, you would think you heard the voice of God himself" (B. iv, ch. viii, 49).

The following verse in the Bible is undoubtedly true: "And there was not a prophet since in Israel like unto Moses, whom the Lord knew face to face."

Moses deserves all the credit for molding the Chaldean God into shape, for creating Jehova, and for inventing prophets and the Jewish oracles.

These oracles, or pretended consultations or inquiries of God, whether heathen or Hebrew, were all of a similar

nature and character. Whenever the question asked was concerning the success or non-success of a battle, whether they should fight or not, the answer depended on the circumstances and the condition of affairs. If the army was well disciplined, had a good leader, a good general, better than the enemy, they were going to fight. If not so well organized, weaker numerically, or with an indifferent general, they would let fighting alone. The priests if well informed would give either a positive or a negative answer, but if they knew nothing about either party, they would deliver the answer of the oracle in such dubious expressions or terms, that let what would happen to the inquirer, the answer might be accommodated or explained to mean the event that came to pass.

The expressions of the Bible during and after the time of Moses are of oracular form, and for that reason of a dubious nature, of marvelous elasticity, accommodating any and every opinion or inquiry, susceptible of a vast variety of interpretations. Many portions may be made to mean anything or everything. There being nothing positive about these biblical expressions, followers of these doctrines have been explaining and explaining. And as new views or opinions are set afloat, clever talkers explain and explain, and grow enthusiastic in explaining. And as fashions change, the explanations change. For centuries these explanations and interpretations have been going on —over what?

Among the Jews there were several sorts of oracles: as, first, those that were delivered *viva voce*, as when God spoke to Moses; secondly, prophetic dreams, as those of Joseph and others; thirdly, visions, as when a prophet in an ecstasy, a nervous, excitable condition, being properly neither asleep nor awake, had what they called supernatural revelations; fourthly, when they were accompanied with the wearing of an ephod, or the pectoral

worn by the high priest, who was endowed with the gift of foretelling future things upon extraordinary occasions; and fifthly, by consulting the prophets or messengers sent by God.

Moses was the first great prophet, the first great general, the first great lawgiver, the first and only organizer, and with his death God, Jehova, ceases to be active.

Everything appears wonderful or miraculous if we do not understand it, or are ignorant and credulous. Thus it was with the manna, that usually falls in certain seasons of the year in that region. Even Moses himself did not know what it was, until it had stuck to his hands and he had tasted it. It was no special favor to the Jews. It falls for all creatures alike, but is not used until it is discovered that it has reached the season when it is good to eat. Nevertheless, it is in our Bible accounted a miracle.

No man has ever performed a miracle except to deceive or delude another, who is ignorant of what he is performing, or how it is performed.

Miracles are natural events occurring to those that are ignorant, or of little understanding; or they are intentionally performed with the intent to deceive, delude, or defraud.

God himself, all believers should know, cannot perform a miracle, contrary to the laws of nature—whether it be the laws governing planets or the laws that govern the various phenomena that appear from time to time on earth. All are simply the result of some natural process.

What shrewdness Moses used, whatever cunning, whatever diplomacy, whatever wisdom or courage, was the production of his own will power, the evolution of his own

brain, acquired by education and training. He utilized these powers to gain his ends, to the best advantage and welfare of the people he was trying to organize.

He may have fully believed in the oracles he invoked, the conception of his own powerful imagination. He may have inspired himself by a concentration of nervous force, stimulated by the immense responsibility that rested upon him.

The solitude he enjoyed in the mountain was of great service to his reflecting mind. It gave him an opportunity to analyze every detail, think over every circumstance, form his ideas and his plans. That it was to him a sanctuary, a holy retreat, we can easily imagine, as every place that becomes a retreat for great thinkers is a sanctum to them, and where, when they are deliberating, communing with themselves, it is no place for strangers to intrude.

We must, however, not lose sight of an important fact—that whatever may be the products of the brain, of the nervous system, however stimulated or inspired the workings of the imagination and the production of ideas, evolving powerful thoughts, and however sublime and beautiful they may be, they are the effect of the educated faculties; the result of the combined forces of the great nervous centers.

Notwithstanding the sagacity and cleverness of Moses, the barbarism and brutality of the age in which he lived was predominant in all his actions towards his enemies. Neither God nor Jehova had any mitigating sentiment, neither pity nor mercy. The ark was a superstitious symbol, and the priest the ready tool to carry out any system to deceive and delude the masses. The ark, the creation of Moses, Aaron, Jethro & Co., was nothing more than an idol of another

form. Whether the idol is in the image of somebody or a four-cornered box wherein lies the difference?

For several centuries this wooden box plays an important role among these half-civilized barbarians. They were no better than their neighbors, and were not any farther advanced in civilization than the neighboring nations were —indeed, not so much.

How Christianity can hold that book, the Bible, as sacred, as a guide for the present civilized age, is indeed a greater wonder and a far more complicated miracle than ever was performed in the Bible.

The superstitious, cowardly army of Joshua refused to cross the river Jordan, but the miracle was performed when the priest carried the ark across the river—which was fordable, because they could see the sand at the bottom, and the stream was neither strong nor swift. So the army forded the stream, following the wooden box. The same box was used before the walls of Jericho. The falling of the walls is related in a mysterious fashion, but the slaughter of men, women, and children is made quite plain. The only thing saved was that prostitute Rahab who betrayed the city—and that was all the doings of God and the Box.

Joshua sends to Ai three thousand men, and the Israelites get beaten. Then after some hocus-pocus Joshua goes to Ai with thirty thousand and he beats them, “and all the men and women that were killed at Ai were twelve thousand” (Josh, viii, 25). And then he hanged the king of Ai (verse 29). And this was a miraculous victory. Every natural phenomenon was interpreted as a miracle. A hailstorm, an aerial phosphorescence imitating sun and moon, the clouds, thunder, etc.—are all miracles, if they help to beat the enemy. And after the slaying was done the kings were hanged (x, 26).

Altogether, Joshua conquered thirty-one kings and took possession of their territories. These kingdoms could not have been very large affairs, since the whole land is not very large. The presumption is that superior numbers and better leadership in reality won the day.

When the strong hand of Moses and Joshua has disappeared (Jehova is no longer the stronghold) quarrels, outrages, and discontent arise. Eleven tribes retire from the field of action. Judah, the warrior tribe, does the fighting. The Levites, this aristocratic tribe, watch and guide the nation, dwelling in the forty cities assigned to them. I mention these two tribes especially on account of the important role they play hereafter.

A few statements of the mere facts will suffice. Joshua dies in 1443 B.C. Othniel succeeds. Judah's military force fights and beats the Canaanites. Discord and fighting continue, until Eglon the king of Moab enslaves them, 1343 B.C. When Eglon is killed they are freed for a short period, when Jabin the Canaanite subdues them. They are again freed and again enslaved, and so on. Meantime they have their heroes, as Shamgar, who kills six hundred Philistines with an ox-goad, and Samson, who kills one thousand Philistines with a jawbone of an ass, etc.

I will append to this chapter a description of some events of Moses's career from Tacitus, Chapter III: "Many authors agree, that when once an infectious distemper was arisen in Egypt and made men's bodies impure, Bocchorius, their king, went to the oracle of (Jupiter) Hammon and begged he would grant him some relief against this evil, and he was enjoined to purge his nation of them, and to banish this kind of men into other countries, as hateful to the gods. That when he had sought for, and gotten them all together, they were left in a vast desert; that hereupon the rest devoted themselves to weeping and

inactivity; but one of those exiles, Moses by name, advised them to look for no assistance from any of the gods or from any of mankind, since they had been abandoned by both, but bade them believe in him, as in a celestial leader, by whose help they had already gotten clear of their present miseries. They agreed to it; and though they were unacquainted with every thing, they began their journey at random: but nothing tried them so much as want of water; and now they laid themselves down on the ground to a great extent, as just ready to perish, when a herd of wild asses came from feeding, and went to a rock overshadowed by a grove of trees. Moses followed them, as conjecturing that there was (thereabouts) some grassy soil, and so opened large sources of water for them."

Chapter IV: "As for Moses, in order to secure the nation firmly to himself, he ordained new rites, and such as were contrary to other men. All things are with them profane which with us are sacred; and again, those practices are allowed among them which are by us esteemed most abominable. They sacrifice rams by way of reproach to (Jupiter) Hammon. An ox is also sacrificed, which the Egyptians worship under the name of Apis," etc.

## CHAPTER XI.

# SAMUEL THE KINGMAKER—THE WARWICK OF ANTIQUITY.

Our forefathers of antiquity, no matter to what nation they belonged, dressed every important event with a halo of mystery—fable, myth, and miracle. They knew no better.

The mind, the brain, the senses, had reached a stage of development that might well be called childish, with sensuality and selfishness predominating. Fighting, cruelty, and lust were the leading actions prompted. And as in the case of children, ghosts and hobgoblins scared them, shadows and darkness frightened them, unusual sights and noises surprised and alarmed them. And in their calmer moments they wondered. And any natural phenomenon was interpreted as miraculous if it aided any undertaking, and resulted favorably to them.

Wealth and women were considered the capital prizes in those days. (That was three thousand years ago; how is it with us?) They were men in physique, but children in the development of their mental faculties.

It was then as it is now—every man talks about that which

is uppermost in his mind; he makes his comparisons with those things he is most familiar with; his illustrations are drawn from those objects he sees most frequently; his language never extends beyond the number of words at his command; his memory is only equal to the number of things he has stored away; his mind is made up or composed of those ideas that he has gathered from the experience of his senses; his ideas from the number of objects he has come in contact with; his knowledge consists of that which he has learned; his thoughts and reflections extend to that which he knows and never beyond; his understanding depends on all these; and comparatively speaking, few men are in advance of the age in which they live.

Ideas, like other things terrestrial, have their birth, growth, development, maturity, and decline, and finally they partially or wholly disappear.

The birth of the idea of God, without the various objective representations, had its origin in the mind of man; Abraham being the first, or supposed to be the first, man who conceived the notion that these images, idols, were not the proper thing. He doubted the quality of the gods, and the principal objection to these idols was that they had ears that did not hear, eyes that could not see, etc., etc., but the new God, the later Jehova, could. The strangest of all inconsistencies lies in the fact that while they endowed him with the human faculties, passions, emotions, desires, and feelings, there is nothing tangible about his body.

Nothing was accomplished with this God during several centuries in Egypt. Moses brought his Jehova out—as a stern reality. He skillfully manipulated the idea. His own intellect and experience, his force and character, were concentrated in this Jehova. His masterly organization, his discipline, his impressive sternness, imperative and

imperial, his stupendous will power, left a lasting impress upon this people during the four centuries. This idea was nursed, nourished, and sustained by the Levites, and when they found their influence was waning they established a concentrated form of government by selecting a sanhedrin or council of seventy and electing the most eligible person they could find on the recommendation of Samuel as their king. This king was Saul, whose reign, fortunately or unfortunately, did not last very long.

Competition and struggle with other nations had, if anything, an educational tendency. As they grew numerically stronger, jealousies arose. Ambitious men were grasping for power, and contending faction naturally was the result.

The story about the lost asses is like that about another ass we have heard of, that saw the angel and talked—we have many such, even at the present day. These stories are excellent fabrications to entertain juveniles with. And people must be precious asses to believe this nonsense, that God would be such an ass as to interfere with these asses.

But something occurred which was perfectly human, and shows the character of the man. It happened to be one of those critical moments in a nation's existence. Nahash the Ammonite had made war against Israel, and encamped against Jabest-Gilead. Saul hearing of it, he did as follows (1 Sam. xi, 7): "And he took a yoke of oxen, and hewed them in pieces, and sent them throughout all the coast of Israel by the hands of messengers, saying, Whosoever cometh not forth after Saul and after Samuel, so shall it be done unto his oxen. And the fear of the Lord fell upon the people, and they came out with one consent." Thus Saul collected an army of three hundred thousand men. That is what may be termed practical politics. He was victorious over the Ammonites. As to the prisoners of war, whether

captured or having given themselves up, he caused their right eyes to be put out. He plucked their right eyes out, making them useless for war in the future.

When he went to war against the Philistines, his army observed how numerous the enemy were. God's army was scared and hid in caves. So he sent to Samuel to consult the oracle, like any other respectable heathen.

He also made a conquest of the Amalekites, whom he utterly destroyed. The Hebrews and these people had a grudge of several centuries' standing, because when the Jews went out of Egypt they requested permission to pass through the Amalekites' country, which was refused them (Ex. xvii, *et seq.*).

But Saul offended God by saving Agag, the king of the Amalekites, so said Samuel (1 Sam. xv, 32, 33). "Then Samuel said, Bring ye hither to me Agag, the king of the Amalekites. And Agag came to him delicately. And Agag said, Surely the bitterness of death is passed. And Samuel hewed Agag in pieces before the Lord in Gilgal."

Saul's tenderness and mercy towards Agag displeased the stern, cruel priest and soldier. His, Agag's, life had to pay the penalty of death, by the hand of the priest himself, for an offense his forefathers were presumed to have been guilty of, several centuries before. All barbarities, cruelties, and slaughter were done in Jehovah's, God's, the Lord's, name. The same pious crimes were repeated centuries later, under the pretext of doing some imaginary brutal God a great favor.

For this transgression Saul is rejected by this priestly Warwick. For this human action this wily priest denounces him, and Saul's act of kindness is interpreted by this domineering priest as a crime against his God. To carry out

his political scheme, Samuel went to Beth-lehem. “And the elders of the town trembled at his coming” (1 Sam. xvi, 4). The revengeful priest, with a nerve of iron and a will of steel, was not going to stand any nonsense. Saul had not obeyed him to the letter—it is, Off with your head!

Samuel with all the church palaver, priest discipline, and pious hypocrisy, selects a successor, without compunction, without ceremony, and David is anointed to reign instead of Saul. From this time forth to the end of his life Saul is constantly in hot water. He slinks to his home at Gibeah (1 Sam. xv, 34) like a whipped cur, rejected and excommunicated by the priest. Full of apprehension and fear, he blunders at every step he takes. The priestly influence is gone, and God has departed from him and is now with David. The crafty Samuel uses the expression, when others question the propriety of his action: “Men do not see as God seeth.” No! Men must have no will except the priest’s will. Harassed and maddened by priestly cunning, jealous and angered at David’s success in acts of heroism, Saul loses courage, as well as prestige with the people, to such an extent that David finds it not a difficult task to organize a small army of his own, carrying on a sort of desultory war on his own account.

Samuel dies, having governed his people twelve years himself, and jointly with Saul eighteen years. He was the greatest man, priest, and general since the times of Moses, a man of singular sagacity and courage, no doubt right royal and honest in his intentions and to his nation. Samuel did more to solidify the nation, and terrify neighboring nations, to infuse courage in his people and inspire them to acts of heroism, than any other of the judges, or any other man, during this period.

A curious incident is related of the manner in which Samuel came into the world. It is the first one of its kind in

the Bible. Hannah, the wife of Elkanah, had no children, or as the Bible phrase has it, “The Lord had shut up her womb” (1 Sam. i, 5, 6). So she continued praying before the Lord, and Eli the priest marked her mouth (verse 12). She conceived and bore a son, and she named him Samuel. And Eli the priest adopted Samuel. “And the child did minister unto the Lord before Eli the priest” (ii, 12). What the relations were between Hannah and Eli is not known, but that his own sons were not very righteous is testified to by the following passage (1 Sam. ii, 20): “Now Eli was very old, and heard all that his sons did unto all Israel; and how they lay with the women that assembled at the door of the tabernacle of the congregation.”

It was not an unusual thing, in the temples of the heathens, for women to accommodate the gods whenever they felt piously inclined; and also the priests lost no opportunity to gratify their saintly passions, or permit others to gratify theirs so long as it was to benefit the church.

Samuel’s father, or rather reputed father, did not belong to the priestly tribe. He was an Ephrathite. Eli his adopted father belonged to the priestly caste. I simply cite this story to show how completely human these holy Jehovaists were. Many crimes and disreputable acts were committed under the very shadow of the Lord. Yet Jehova was pleased with anything these priests delighted in.

Eli was a heavy man (iv, 18). Fat, which I suppose they meant, shows he was a good liver. He broke his neck by falling off his seat on hearing the ark was taken by the Philistines and Israel beaten.

When Samuel took the reins of government he was still young. He subdued the Philistines, regained the ark, and reorganized and consolidated the nation. He made Saul king and general, and a stream of prosperity followed; the

choice was a good one, and Saul served his nation well so long as he was obedient to Samuel's commands. Saul's humanity got the better of him, he offended this stern, dictatorial priest, and lost his favor. David, his rival, was already chosen and in the field, on whom all Samuel's influence and priestly glory was shed. Now God deserted Saul and his cause. Henceforth the Lord was with David.

Samuel was the first and only kingmaker; Saul and David were his handiwork. He was a priest, a soldier and a statesman of more than ordinary capacity and qualities, far superior to any of the judges that governed Israel during the last four centuries. He was stern and severe, but without blemish otherwise. He was, as far as we can learn from history, a relentless and cruel man towards his enemies. He was of immense will-power, resolute and energetic. He was honored to an extraordinary degree by the people for whom he accomplished so much. He left the nation at his death more firmly united than it had ever been —with an organized army, a stable government, and a well-filled treasury. It was Samuel that really raised the nation to the utmost hight that it ever attained, for he laid the foundation for Solomon's glory, the zenith of Hebrew nationality.

It is he that closes the second period of national life, the people having attained under him its maximum standing as a nation, and the greatness which culminated in Solomon, and the only political unity as a nation that the Hebrews ever had.

A parallel may be drawn between the two periods. The Egyptian period: Four centuries or so pass without anything being done, until a man rises possessing the necessary qualifications to mold these people into a nation. The second period consists of a struggle with other nations, almost continuously, to exist. Necessities arise; men

present themselves who seize the opportunity to fill up the want for the time being, until the coming of Samuel, the right man, at the right time, for the right place. He closes the second act of the Hebrews' struggle for nationality by giving them a centralized form of government, and placing a king at their head to rule them.

All the transactions of his life were human, natural. His conduct was perfectly in harmony with the age he lived in. The nation as a whole had become a little more civilized, and had reached as high a point of intelligence as it ever attained—that is, as a nation.

Thus far we have not seen anything in their history that other nations had not to contend with. To attribute their acts, individually or as a nation, to any supernatural power, to God, Jehova, or the Lord, is preposterous. In their dealings, their fightings, their cruelty, their brutality, their superstition, and their ignorance, they were in no sense superior to any of the contemporaneous nations. They were no better in their conduct than their neighbors. The strongest had always the best of it; the conquered had to submit to slavery or be killed, women are captured and used, and the plunder is divided.

Notwithstanding the priestly rule of the Levites, the Hebrews are constantly relapsing into idolatry, brought back to the fold, and relapsing again.

The church was at this time used for all sorts of corrupt purposes. The Jehova that had been brought into the theological world with such an immense boom by Moses had expended a good deal of its original force.

The remembrance of that stupendous crisis of the Hebrew national existence was kept alive and the flames were fanned by priestly interest. The God after Moses, the

Jehova, had shrunk into the Lord, and the ark was the representative of God. “The ark of God was taken,” … “when she heard tidings of the ark of God” (1 Sam. iv, etc.). And the success or failure of the Hebrews depended on the man who led them. With a weak man as general or leader they were beaten, with a strong man they won.

Other nations meanwhile had sprung into life, and become powerful, without Jehova—without the God of the Hebrews. They had, however, idols and images, which seemed to behave with far greater propriety than the God of Israel. So well did these mythological deities manage their affairs, that they almost swallowed up the whole Hebrew race.

Samuel, having established a kingdom, and crowned two kings, Saul and David, dies, leaving these two competitors in the field.

## CHAPTER XII.

# GOD SAVE THE KING!

That was the shout, with the commencement of the new era, when the tallest man in the nation appeared in the midst of the people that had assembled at the call of Samuel (1 Sam. x, 24).

I will give a short chronology of this United Kingdom under three kings—Saul, David, and Solomon:

| | | |
|---|---|---|
| Saul is made king | 1095 | |
| Dies | 1055 | |
| Rules over Israel about | | 40 years |
| David born | 1085 | |
| Kills Goliath | 1062 | |
| Reigns in Hebron | 1055 | |
| King over Israel | 1048 | |
| Dies | 1016 | |
| Rules over Israel about | | 40 years |

| | | |
|---|---|---|
| Solomon is born | 1036 | |
| Is crowned king | 1015 | |
| Lays foundation of Temple | 1012 | |
| Dedicates the Temple | 1004 | |
| Worships idols | 985 | |
| Dies | 975 | |
| Rules over Israel about | | 40 years |

These figures may not be accurate. They are as near as the dates can be had. Josephus gives the dates as follows:

| | | |
|---|---|---|
| Saul reigned with Samuel | 18 | years |
| After the death of Samuel | 22 | ,, |
| David lived | 70 | ,, |
| Reigned in Hebron | 7 | yrs 6m |
| ,, Jerusalem | 33 | years |
| Solomon lived | 94 | ,, |
| Having reigned | 80 | ,, |

There is a discrepancy somewhere. Something is wrong in dates, like most other facts in the Bible.

David was twenty-three years old when he killed Goliath. Solomon was twenty-one years old when he was crowned king; according to Josephus, fourteen years of age.

We have no further interest in the dates of those men, but

more in their acts and character. Being the rulers of God's own chosen people—with Jehova for a pilot, protector, and guide—with the wooden Box, the ark, with all its mysterious secrets and its holy enchantments; priests, prophets, and sacrifices, with all their secret necromantic performances, these three men, with all their godly professions, were no better than they should have been, even for the age in which they lived.

They were brutal, gross, and licentious. Barbarous crimes were committed by them, with the sanction of their preposterous imaginary God—who is lauded at this present day to the very echo, but the most stupendous piece of folly that ever was palmed off on civilized humanity.

Saul, the first king, in exercising his terrible cruelty towards his enemies perhaps only followed the practices and customs of other nations. Why this bloodthirsty man caused 385 persons to be murdered; why he slaughtered all the inhabitants of Nob, men, women, and children, because Abimelech the priest supplied David with food, are some of those things that pulpit orators can best explain. The life of the priest was not sufficient to expiate the offense he had committed, but Saul had his whole family exterminated.

The ark was no longer available. Jehova had taken the juvenile David in hand. The priestly oracle refused to be consulted. He, Saul, had recourse to a fortune-telling woman of Endor, who was employed to call up the spirit of Samuel.

Saul's jealousies, his quarrels with David, and all his misdeeds, as well as bravery, may be read by those that feel an interest in the matter. He finally committed suicide by falling on his own sword, and the next day the Philistines cut his and his sons' heads off, and deposited them before their idols, Dagon, etc.

Where was God? Can it be possible that our Christian neighbors believe that the life and conduct of Saul was directed by any supreme power? That God directed Saul to do so many foolish, barbarous, and murderous acts?

We shall probably be more interested in David, the man after God's own heart.

David, like Saul, was judiciously selected by Samuel. David's acts and David's conduct were no different from the acts and conduct of any other man in his position and possessing his characteristics. He combined a good deal of philosophy with his bravery; if the Psalms were written by him we have before us a higher type of brain culture, a mind that has undergone some training, is capable of analyzing its own feelings and giving expression to them. His comparisons never extend beyond that—beyond what he knows. He appeals to the higher qualities of men—their good acts, their virtues, their just conduct, their self-restraint, their passions, emotions, faults, and weaknesses. He recognizes them in others, and sees them reflected clearly in himself. His distress and his fears, his gladness and his joys, his trust in an unseen power, are all poetic, some sweet and sentimental. He speaks of his Lord, of his God, as of the pleasant recollections of a dream. Jehova had long since lost the stern reality of Moses, and had changed with the changes the nation had undergone. The formalities had been kept up, the priestly luxuries had increased, the ceremonies were more formal and business-like, but the central power, the centralized government of the people, the mantle of authority, had been shifted from high priest to king.

The God, Jehova, was no longer the guide, the power it had been. For twenty-two years after the death of Samuel, Saul had conducted his government and fought his battles without God, ark, or priest, and sought advice and counsel

from other and human sources.

Skeptics even at this early period began to doubt the existence of a God, “The fool saith in his heart, There is no God” (Ps. xiv, 1).

The theocratic period of 395 years from Exodus to Saul had already developed corruption in the church and licentiousness in the Temple. The priestly power received a terrible blow at the hands of Saul when he slaughtered the priest, Abimelech, and his family, thus showing that the representative of God no longer inspired terror; that the priest was nothing more than any other man; that neither God, Jehova, ark, nor any other sanctified paraphernalia could protect him, nor miracle interfere for his preservation.

Opinions were freely expressed, discussion arose, and arguments were not wanting to sustain the doubts that had arisen as to the genuineness, the truth, of the God they had adopted. Neighboring nations had their gods. How was it, if their gods were not more potent, that they should win so many battles, and enslave the nation of the true God?

The same or similar arguments that Abraham brought to bear on the Chaldean gods were now beginning to be used against Jehova.

David, besides being an excellent soldier, a brave general, was a dreamer, a man of imagination. God was to him a sublime vision, a reflected glory of the past. To him, an intense admirer of the beautiful, trees, hills, and valleys, and the phenomena of nature in general, were the wonders of his imaginary God. He was a musician, a poet, a dreamer, in his moments of leisure. Everything he beheld courted, kindled his admiration, awoke new feeling in his sensitive nature, from a pretty flower to a beautiful woman.

The conversations which he holds with his visionary God are the simplest and most confidential. He pours out his grievances and his delight to him. “Thou hast put gladness in my heart.… I will both lay me down in peace and sleep” (Ps. iv, 8, 9).

That Christian translators of the Bible presume to interpret certain passages and words to mean, to foretell, things or events that occurred one thousand years later, is an assumption, and warrantable neither by the text nor by the actions of the persons writing them.

David is supposed to have written the Psalms. When he speaks he refers mainly to himself, addresses himself personally to his Lord. He, David, is himself interested. Then again he speaks of man and things in general, without ever alluding to any one thing or body in the coming future.

David’s Psalm ii is headed “The Kingdom of Christ.” The writer had no more idea of Christ than he had of Peter the Great at the time that that Psalm was written.

David wrote one hundred and fifty Psalms as printed in the Bible. In the headings, the superscriptions, the solicitude of Christian believers, trying to torture meanings and significations out of sentences or expressions, led them to commit gross errors, as false as they are ridiculous. Judge for yourself:

Psalm ii, 1—*The Kingdom of Christ*.

“Why do the heathen rage, and the people imagine vain things?” Verse 10: “Be wise, now therefore, O ye kings; be instructed ye judges of the earth.”

Psalm xlv, 1—*The majesty and Grace of Christ’s*

*Kingdom.*

"My heart is inditing a good matter; I speak of the things which I have made touching the king; my tongue is the pen of a ready writer."

Verse 10—*The Duty of the Church, etc.*

"Hearken, O daughter, and consider, and incline thine ear; forget also thine own people, and thy father's house."

Psalm xlvi, 1—*Confidence Which the Church, etc.*

"God is our refuge and strength, a very present help in trouble."

Psalm xlvii—*The Nations are Exhorted Cheerfully to Entertain the Kingdom of Christ.*

Psalm xlviii—*The Ornaments and Privileges of the Church.*

In not one of these Psalms is there the slightest allusion to a church. It is the extravagant language of an exuberant mind, the outcome of an overwrought imagination upon the subject he was thinking about.

Psalm l, 1—*The Majesty of God in the Church.*

Psalm li, 18—*He Prayeth for the Church.*

Psalm lxviii, 7—*For His Care of the Church.*

Psalm lxxii, 1—*David Praying for Solomon, etc.; and The Truth of Christ's Kingdom.*

Psalm xciii—*The Majesty and Power of Christ's Kingdom.*

Psalm cxviii, 19—*Coming of Christ's Kingdom, etc.*

The passage referred to, viz., verse 19, is: “Open to me the gates of righteousness; I will go into them, and I will praise the Lord.”

The absurdity of the interpretation is evident from the fact that out of one hundred and fifty Psalms the Christian Bible-makers were able to find only five that could be twisted to make allusion to Christ—the ii, xlv, lxxii, xcviii, and cxviii, and from these certain sentences were selected, and these verses have as much connection with Christ or his kingdom as they have with the man in the moon. Six of all the chapters are supposed to allude to the church; those are above cited.

David had not the remotest notion what would or could happen at any time during his life, or at any time after his death. He was a child of circumstances like Saul, and like many other men after and before them. The same may be said of Moses and Abraham. Opportunity makes the man, if the man is fitting, able, to seize the opportunity when it occurs. No supernatural power had anything to do with any one of these men, or any man that figured in the Bible, any more than God had to do with men that played prominent parts as leaders, rulers, kings, or governors of other nations. Whatever power, skill, intellect, or imagination was developed, it was the proper sum-total of the experience, observation, and instruction of the world’s progress.

The Hebrews perhaps had special advantages in some respects over other nations, through their migratory instinct or inclination. The contact with so many other nations gave them the advantage of a broader experience and a greater variety of culture.

David had enjoyed special advantages. After his first heroic action, he became the leader of a band of

desperadoes. And Saul himself unwittingly helped him, by making the bargain with David that if he, David, brought him one hundred foreskins of the Philistines, Saul would give him his daughter Michal for wife. David with his band of chosen men brought him two hundred, and thus obtained his wife Michal. Henceforth David leads a kind of bandit's life, with his six hundred brave followers, evading Saul, who is in hot pursuit of him, and meantime fighting other nations, Philistines, Amalekites, etc.; levying contributions, making conquests, whenever and wherever there was a chance; falling in love easily and gracefully as the most expert leader of a gallant band. The pretty, attractive face of Abigail, the wife of Nabal, was an irresistible temptation. Nabal died from fright, it is said. Later in life when he happened to cast his eyes upon the beautiful nude figure of Bathsheba, he immediately fell in love. Since he was a man of action he satisfied his passion almost immediately, and poor Uriah, a captain of his, was sent to the war to be killed.

He was a shrewd and bold warrior, a great lover of woman, a philosopher and a poet. His Psalms bear witness of his acts, deeds, and thoughts. In consequence of his overindulgence with women he contracted a disease, a disease of which he complains most bitterly. Psalm iv: His bones are vexed, he is weary with groaning—"All night make I my bed to swim; I water my couch with my tears" (verse 6). Psalm xxxviii: He is in a sad plight: verse 3: "There is no soundness in my flesh;" verse 5: "My wounds stink and are corrupt because of my foolishness;" verse 7: "For my loins are filled with a loathsome disease; and there is no soundness in my flesh," etc. The gentleman in all probability was afflicted with a disease known as syphilis in its tertiary stage. There is more of it.

A sober reading of these psalms will find them full of indications of human nature with its frailties, weaknesses,

impulses, mixed with superstitious fear, a vivid imagination, and an excitable temperament.

When his greatness had been established, many conquests made, great wealth accumulated, numerous victories gained, festivities were inaugurated. In order to honor God and the ark, David danced and jumped in complete undress before the Box, in a true half-civilized fashion.

We must not consider all these acts as faults. He simply followed the customs of the age. He was the highest representative type of the then struggling civilization. Samuel began, Saul developed, and David consummated a new era of this part of the world of human history—while other sections of the globe were keeping abreast in organizing and drilling the human race to a higher sort of culture, forming nations, establishing kingdoms, producing heroes, evolving lawgivers and poets, and advancing in the arts and war, etc.

David died seventy years of age, leaving a large and numerous family. Of his score of sons, there is none worth talking about, except Solomon, his successor. The immense wealth he amassed laid the foundation for the glory of Solomon, who spent it lavishly, luxuriously, freely.

All in all David was an excellent character. He preserved the Twelve Tribes, exalting the nation, consolidating the government, making it respected and feared without, and giving them by his valor peace and security and prosperity for the next ruler and for the nation.

This young gentleman, Solomon, however, had been fed with a golden spoon. His senses and his passions were prematurely ripe. He did not have to search for opportunity; his desires were easily accommodated and

satisfied. His indulgences were many and frequent, and his authority and arbitrariness were soon made manifest.

He was surrounded with the best scholars of the day, and whatever facilities were then to be had were got, either in philosophical works or in other books. The higher studies consisted in close observance of moral conduct, and contemplation of the outer world without knowing anything more than the outward appearances. Science, art, and mechanics were little known.

The school of poesy had begun. Theological disputes were in fashion, and thus theological doubt furnished ample food for conjecture, hypothesis, and imagination. Men had already entered the field of controversy as to the falsity or the truth of the prevailing opinions.

King Solomon in all his glory was the greatest showman upon earth at the time he was living.

Let it be understood that it is not our purpose to write history. That has long since been exhausted; nothing new can be discovered. It may, however, be profitable to call attention to the fact that all these men that figure in the scripture were human, perfectly human. That they acted and spoke in accordance with the prevailing degree of intelligence and customs of nations. That in all their dealings and doings there is not one scintilla of evidence that they were anything else than perfectly natural. That they were struggling as a nation for a position among the family of nations. That their methods of warfare were no better than those of their neighbors. By good generalship, brave conduct, and hard fighting they gained influence, affluence, and prestige. By their conquests and victories they got into possession of a fair tract of land. By robbery and plunder they amassed an immense amount of wealth. By their continual successes under David's brave

leadership they secured peace from their enemies, their surrounding neighbors; while those nations were subdued and weakened, the Israelites became powerful and strong. A well-disciplined army, a strong and united nation, was the inheritance Solomon received.

He was the prince-royal—his father a clever king, and his mother the captain's wife, Mrs. Bathsheba, later queen-wife of David. He was the first real prince that had ever ruled Israel—and also the one that caused their ruin, as a nation, by his extravagant and lascivious conduct.

The scriptural story begins in Kings, with the death of David. Solomon, the prince of the blood, was now king in his stead. He ascended the throne when he was twenty-one years of age, having received every educational advantage of a prince. He, after Moses, is the second ruler of Israel that had been instructed and prepared for the high position he was about to occupy. That is the only comparison that can be made between him and Moses. The latter was a giant of intellect, action, and determination, while the former was a luxurious debauchee and squanderer of his father's patrimony.

Why there should be so much adoration and adulation poured out on this man, I fail to see. Because he built the temple and made profuse exhibition of his gold and silver? He could not have built it if his father had not plundered other nations, and given him, Solomon, the money to build with.

Because he had an immense number of chariots and soldiers, decked with costly trappings? The money was there to provide these with, and later the people were pretty heavily taxed for his extravagance.

The only real point of glory may perhaps lie in the fact that

he had one thousand women to play with. We all know that he beats the record on that particular branch of human enterprise. There was truly none like him before or since.

And lastly, we have his purported writings, consisting of the Proverbs, Ecclesiastes, and the Songs of Solomon.

No sooner was he seated on his throne than he began to remove all objectionable persons, those that were likely to be troublesome or dangerous. His elder brother, Adonijah, whose aspiration led him to great things, was dispatched by Benaiah, Solomon's future general. Abiathar, the priest, he removed where he could do least damage. Joab, David's general, who sought the altar of the temple for protection, Solomon ordered Benaiah to behead. Zadock he made high priest in place of Abiathar. Shimei was the next man on the list for death, and Benaiah received order to kill him. Having removed all dangerous or antagonistic men, Solomon settled himself firmly in his kingdom. Those that are curious may read all about the Temple, his house, the wall, cherubim, vessels and the like of gold, the royal palace, splendors, etc., etc. He became what is termed a glorious king, but luxury and women soon had their effect upon his judgment.

He had reached the zenith of Israel's greatness. He had touched the highest point of its eminence. It was the golden age of the Hebrews—the age of pomp, pride, braggadocio, and exhilaration. Jerusalem became the great center of attraction. Everything obtainable was collected within its walls. No expense was spared. Indeed, the city became the center of luxury, extravagance, and licentiousness. And Solomon was surely, though slowly, paving the way for the destruction of the nation. The older he grew the worse he got. His reason gradually deserted him; he wasted his energy and his strength on his women, so that when he died he was despised, if not hated, by his

people. And he left such a rotten condition of affairs that it tumbled to pieces almost before he was dead.

In the course of human events, certain results follow a given line of conduct in the affairs of man. The current of events depends upon our actions, whether good or bad, better or worse. Drain or waste of force and energy, of an individual or of a collective body as a community, state, or nation, slowly but surely weakens, undermining the natural healthy condition, and ultimately leads to a breaking down, and may bring about a final disintegration.

Solomon began his reign with an abundance. He had a plenty both of means and health; a most extraordinary opportunity, with an ample training and education; an immense, well-organized army; a stable, firm government, with a full quota of understanding or wisdom.

As a rule men get wiser as they grow older. They acquire greater deliberation, sounder judgment, better understanding, more skill in the management of affairs, of man and of state. They are generally more conservative in their actions, more cautious in their dealings, more abstemious in their desires. Their pleasures are restricted, their passions subdued, their wants few, and their pursuits in life so evenly regulated, their conduct so accurately adjusted, that a justice and a wisdom seem to guard every thought and every reflection.

Solomon's course was like that of a balloon. He started chockfull of wisdom. He was a marvel, and made a prodigious show. He was a startling phenomenon, the wonder of the age. (You know he asked God for wisdom and God gave it to him; why did not God keep him wise?)

In old age he lacked wisdom. He had almost grown into a senseless imbecile. He was a squanderer of energy, a *roué*,

a debauchee, a frivolous and licentious old man who frittered away his time and his brains on his women and their playthings.

When the pomp, pride, vanity, show, and bluster of his youth and manhood were exhausted, all there was left was the remnants of a glaring painted show. He had, as it were, danced and skipped and capered, sung and spoken his lines, in a blaze of glory and extravaganza on the stage of human affairs; the curtain drops, and alas, you behold, when the paint and gorgeous dress are removed, a simpering, brainless old image-worshiper.

But what a colossal church figure this man makes! What a miraculous personality he is made to be! What a wonderful creation of the Christians' God! A pity some pope has not canonized him and manufactured him into a saint.

As to his writings—if he really wrote them, and they were not compiled or written for him—it is to be regretted that his conduct was not regulated by them.

A most astonishing perversion of truth is the attribution to the eight chapters of the Song of Solomon of the subject of the church's love unto Christ.

The following are the chief interpretations:

Chapter i, verse 1: "The song of songs, which is Solomon's."

*Meaning*—The church's love unto Christ.

Verse 5: "I am black, but comely, O ye daughters of Jerusalem, as the tents of Kedar, as the curtains of Solomon."

*Meaning*—She confesseth her deformity.

Verse 7: “Tell me, O thou whom my soul loveth, where thou feedest, where thou makest thy flock to rest at noon,” etc.

*Meaning*—And prayeth to be directed to his flock.

Verse 8: “If thou know not, O thou fairest among women, go thy way forth,” etc.

*Meaning*—Christ directeth her to the shepherd’s tent.

Verse 9: “I have compared thee, O my love, to a company of horses in Pharaoh’s chariots.”

*Meaning*—And showing his love to her.

Verse 11: “We will make thee borders of gold and studs of silver.”

*Meaning*—Giveth her gracious promise.

Verse 12: “While the king sitteth at his table, my spikenard sendeth forth the smell thereof.”

*Meaning*—The church and Christ congratulate each other.

Chapter ii, verse 1: “I am the rose of Sharon and lily of the valley.”

*Meaning*—The mutual love of Christ and his church.

Verse 8: “The voice of my beloved! behold, he cometh leaping upon the mountains, skipping upon the hills.”

*Meaning*—The hope.

Verse 10: “My beloved spake and said unto me, Rise up, my love, my fair one, and come away.”

*Meaning*—The calling of the church.

Verse 14: "O my dove, that art in the clefts of the rocks, in the secret places of the stairs, let me see thy countenance, let me hear thy voice; for sweet is thy voice, and thy countenance is comely."

*Meaning*—Christ's care of the church.

Verse 16: "My beloved is mine and I am his: he feedeth among the lilies."

*Meaning*—The profession of the church, her faith and hope.

Chapter iii, verse 1: "By night on my bed I sought him whom my soul loveth: I sought him, but I found him not."

*Meaning*—The church's fight and victory in temptation.

Verse 6: "Who is this that cometh out of the wilderness like pillars of smoke, perfumed with myrrh, and frankincense, with all the powders of the merchant?"

*Meaning*—The church glorieth in Christ.

Chapter iv, verse 1: "Behold thou art fair, my love, behold thou art fair; thou hast doves' eyes within thy locks: thy hair is like a flock of goats that appear from Mount Gilead."

*Meaning*—Christ setteth forth the graces of the church.

Verse 8: "Come with me from Lebanon, my spouse," etc.

*Meaning*—He showeth his love to her.

Verse 16: "Awake O north wind; and come thou south;

blow upon my garden, that the spices thereof may flow out. Let my beloved come into his garden and eat his pleasant fruits."

*Meaning*—The church prayeth to be made fit for his presence.

Chapter v, verse 1: "I am come into my garden, my sister, my spouse. I have gathered my myrrh with my spice; I have eaten my honeycomb with my honey; I have drunk my wine with my milk; eat O friends; drink ye, drink abundantly, O beloved."

*Meaning*—Christ awaketh his church with his calling.

Verse 2: "I sleep, but my heart waketh, it is the voice of my beloved that knocketh, saying, Open to me, my sister, my love, my dove, my undented; for my head is filled with dew, and my locks with the drops of the night."

*Meaning*—The church having a taste of Christ's love, is sick of love.

Verse 9: "What is my beloved more than another beloved, O thou fairest among women? What is thy beloved more than another beloved, that thou dost so charge us?"

*Meaning*—A description of Christ and his graces.

Chapter vi, verse 1: "Whither is my beloved gone, O thou fairest among women? Whither is my beloved turned aside? that we may seek him with them."

*Meaning*—The church professeth her faith in Christ.

Verse 4: "Thou art beautiful, O my love, as Tirzah, comely as Jerusalem, terrible as an army with banners."

*Meaning*—Christ showeth the grace of the church.

Verse 10: “Who is she that looketh forth as the morning, fair as the moon, clear as the sun, and terrible as an army with banners?”

*Meaning*—And his love towards her.

Chapter vii, verse 1: “How beautiful are thy feet with shoes, O prince’s daughter! the joints of thy thighs are like jewels, the work of the hands of a cunning workman.”

*Meaning*—A further description of the church’s graces.

Verse 10: “I am my beloved’s, and his desire is towards me.”

*Meaning*—“The church professeth her faith and desire.”

Chapter viii, verse 1: “O that thou wert as my brother, that sucked the breasts of my mother! When I should find thee without, I would kiss thee; yea, I should not be despised.”

*Meaning*—The love of the church to Christ.

Verse 6: “Set me as a seal upon thine heart, as a seal upon thine arm, for love is as strong as death; jealousy as cruel as the grave; the coals thereof are coals of fire, which hath a most vehement flame.”

*Meaning*—The vehemency of love.

Verse 8: “We have a little sister; and she hath no breasts; what shall we do for our sister in the day when she shall be spoken for?”

*Meaning*—The calling of the Gentiles.

Verse 14: “Make haste, my beloved, and be thou like to a roe or to a young hart upon the mountain of spices.”

*Meaning*—The church prayeth for Christ’s coming.

These are the verses specifically interpreted and marked for Christian worshipers. It must be remembered that the most decent were selected. To say the interpretations are absurd, is putting it very mildly. Solomon had no more idea of Christ than he had of the laws of gravitation.

He was describing and writing about that which was constantly occupying his mind and his time. He portrays a love-sick swain, with all the details that are pleasing both to his eye and to his fancy. He gloats and feeds upon his passions, thus:

“His left hand should be under my head, and his right hand should embrace me” (viii, 4).

“How fair and how pleasant art thou, O love, for delights” (vii, 6).

“There are threescore queens and fourscore concubines, and virgins without number” (vi, 8).

“His mouth is most sweet; yea, he is altogether lovely. This is my beloved,” etc. (v, 16).

“Thy lips, O my spouse, drop as the honeycomb; honey and milk are under thy tongue” (iv, 11).

“Behold his bed, which is Solomon’s; threescore valiant men are about it,” etc. (iii, 7).

“His left hand is under my head, and his right hand doth embrace me” (ii, 6).

"Behold thou art fair, my love, behold thou art fair; thou hast doves' eyes" (i, 15).

It is an outrage on decency even to attempt to construe the intent of these songs. The man sang about his woman, like any other swain who delights in his love. Solomon enjoyed nude beauties, as many men do in our day, and he represented the various parts of the female anatomy most accurately. He reveled in the luxurious contemplation of them. Pull down the curtain of hypocrisy and falsehood and let's have the truth—as it was, as it is.

Solomon died at a pretty fair old age, having lived ninety-four years. The country had been harassed by robbers, the factions began to be restless, conspiracies were forming, and the people were nervously yet patiently waiting for a chance to revolt. No sooner was he dead than the nation split into two kingdoms. Henceforth this people as a nation is doomed. It soon disappears from the family of nations.

But—where is Jehova all this while?

Note.—"Solomon's wickedness became intolerable, fully confirming my former observations, that his wickedness began early and continued very long" (Josephus, Bk. viii, Chapter vii).

## THE TWO KINGDOMS—JUDAH, ISRAEL.

David was dead; Joab the great general had been decapitated by Solomon; and what Samuel, Saul, and David had built up, Solomon had been very successful in pulling down.

Ten tribes revolted immediately and formed the kingdom

of Israel, selecting Jeroboam as their king, 975 B.C. In order to establish a church, a temple, of his own, and his own gods, Jeroboam made two golden heifers and built two little temples for them, claiming that men had built the Temple at Jerusalem as men had built the temples here, and so there was no difference between them. Besides, they would save the journey to Jerusalem. This change was immediately put into effect. One class or tribe was dissatisfied. Those were the Levites, and they emigrated to Judea. This new kingdom of Israel was not over-tranquil. Prophets, and stump orators, agitators, naturally arose. Dissension, bickering, and quarrels appeared. The outlook for the kingdom was not of the brightest.

Meantime Jeroboam was in clover.

Rehoboam, the son of Solomon, was made king of the two tribes, Judah the fighting tribe and Benjamin the king-giving tribe. Besides these two tribes, we must not forget the Levites, for because of them his kingdom was augmented. The priests of all Israel were Levites, and there were quite a multitude of them.

Rehoboam was a Solomon on a very small scale. He had only eighteen wives and thirty concubines, and twenty-eight sons and threescore daughters. He followed in his father's footsteps and led a jolly life, as we should call it in our present age. In 971, four years after he ascended the throne, Shishka, king of Egypt, knowing of all the gold and silver Solomon had stuck into the Temple, invaded Judea with some four hundred thousand men, etc., without opposition, cleared the temple of all the gold and everything of value, and returned home without striking a blow. Rehoboam was a coward, he was afraid. As soon as Judea was clear of Shishka's army, Rehoboam had these gold ornaments that had formerly decorated the temple, which had been carried away by Shishka, replaced by brass

trimmings of the same make and style, and delivered them to the keeper of the king's palace.

These people were too like their brethren in Israel, for "they built them high places, and images, and groves on every hill, and under every green tree" (1 Kings xiv, 23).

"And there was war between Rehoboam and Jeroboam all the days of his life" (1 Kings xv, 6). These two nations therefore have been launched at a pretty fair pace on the downhill grade.

Judah, however, had the best of it. For the kingdom of Israel lasted only two hundred and fifty-four years. Shalmanezer, king of Nineveh, takes Samaria and carries the Ten Tribes into captivity. These are what are usually known as the lost tribes. Lost nonsenses!—they had forsaken their former method of worship and adopted another.

The kingdom of Judah lasted to the time the Temple was burnt, 588 B.C., having lasted three hundred and eighty-seven years—one hundred and thirty-three years longer than the kingdom of Israel. And what is more, these are the very Jews that are scattered all over the world. These latter are the representatives of these three tribes, Levi, Benjamin, and Judah. And if any person is curious enough to inquire of any Jew to what tribe he belongs, he will receive the answer that he belongs to one of the three above mentioned, that originally formed the kingdom of Judah. Why they were preserved is nothing miraculous. It has nothing to do with God or Jehova, or the ark, or any special grace, as people generally believe. The reason is plain and perfectly natural. The Levites preserved them, the Levites sustained them, the Levites were the brainy race. The Levites, the priestly tribe who were appointed by Moses, himself one of that tribe, to be the rulers,

governors, lawgivers, fosterers, priests and preachers, were the brain of the whole nation. They clung to the idea of nationhood with all their priestly might, craft, and ingenuity, and are still clinging to it, with all their might and main. Judah and Benjamin survived only because of the Levites.

## THE MIRACLE-MONGERS.

At 958 B.C. Abijah is king over Judah. He reigns only three years. King Asa follows, 955.

Nadab follows Jeroboam, king of Israel; dies; and Baasha reigns in 954.

"And there was war between Asa, and Baasha king of Israel, all their days" (1 Kings xv, 16).

These facts go to show that fighting continued between Israel and Judah. Foreign powers are now invited to help, and the struggle continues.

In 918 Ahab is king of Israel. It is during his reign that a new class of men rise, agitators, talkers, prophets, and small miracle-makers.

Elijah makes his appearance. Jehu had already prophesied against Baasha; he was a minor star in the field of prophecy. Elijah the Tishbite, who was of the inhabitants of Gilead, "said unto Ahab," etc., says 1 Kings xvii, 1. Ahab was king of Israel 918.

No miracles are reported to have occurred after Moses.

Joshua did not perform any, except that incident about the sun. During all these centuries from 1443, the date of Joshua's death, up to the reign of Ahab, not a miracle-maker appears. There are strong men, bad men, fighting men, priests, brave generals, very wicked men, etc., but none performs a miracle.

Another class of men are soon to appear. They, however, do not make their appearance until a century later, or so. I mean the nervous men, the visionary dreamers and prophets of the type of Isaiah. In addition, any number of soothsayers, necromancers, fortune-tellers, and quacks had entered into the business of miracle-making on a small scale. And a new school of skeptics and philosophic speculators slowly developed.

Civilization had not advanced much, but it nevertheless was progressing. The minds of men had undergone an evolution. The Jehova of Moses, or the simple abstract form of the Chaldean idol of Abraham, had lost its force, prestige, and importance. The ark, that sacred box, is completely lost sight of in these stirring times of revolution, rebellion, dissension, and fighting.

The high priest since the time of Saul had to take a subordinate position. He was the minor oracle, the fault-finder, sometimes the counselor, but never the leader. There was also great competition among the prophets. The trade had grown profitable, consequently false prophets, as they were termed, were trying to gain royal favor. The ideas about God and Jehova had increased and multiplied. Disputes and confusion swayed the people. Idolatry flourished, and the Gods of Abraham and Moses were to some extent still sustained by the relatives of the man who created Jehova, Moses.

Man's progress in thought, the evolution of the human

brain, is slow and uncertain, especially when the line of advance is of a speculative and problematic character. It is not like a scientific question, that can be demonstrated; accompanied by actual proof and absolute certainty; with no discussion or equivocation, no denial or speculation; which once established remains forever the same. Euclid's geometry has never been disputed. Hippocrates in medicine—whatever he said that was known and true, remains unchanged. Everything that is based upon facts lasts forever.

## CHAPTER XIII.

# JEHOVA TAKES A REST.

God rests and lets the Hebrews take care of themselves for a period of four hundred and seventy-six years.

During these several centuries we hear nothing of miracle or of prophecy, of any importance. In fact, we have passed the only time God or Jehova made himself at all conspicuous. He never appeared again so prominently. He made his exit with Moses. When we hear of Jehova it is but the mere echo of his former self.

It is not our purpose to examine or criticise the balance of the Old Testament, but for the sake of showing how human and natural is all the course of these people struggling and making an attempt to exist as a nation, it will be well to consider the actual state of affairs of God's people, after they had become a nation.

Joshua, the disciple of Moses, the general and leader after him, subdued and conquered the territory Moses had indicated, and divided the land among eleven tribes.

He followed the example of his master. He was a man of resolution and energy, and at this time he had a well-

disciplined army. He was quick and active in his movements, with the prestige of Moses to back him. He made war on neighboring nations, slaughtered, hanged, and conquered, sparing nothing. He was shrewd and strategic. He consolidated the nation. He was wise, eloquent, and persuasive.

This closes the existence of the republican or theocratic form of government, not a very glorious career of the Hebrews as a nation.

Nothing very remarkable occurs during these four centuries, but we have a variety of incidents, all interwoven with superstitious notions of a barbaric, miraculous nature. Besides the introduction of the Box, called the ark, female agitators and heroines are introduced. Debora and Barak deliver the people from Sisera, by means of Mrs. Jael Heber, who drives a tent-nail through his temple while he is asleep. Then there is great rejoicing and another miracle is performed.

Meantime they were in slavery under the Assyrians for eighty years—freed by Othniel; under the Moabites eighteen years—freed by one Ehud. Under the Canaanites they were in slavery twenty years, and were delivered by Barak and Debora. The Midianites afflicted the country for seven years, and Gideon delivered them.

And this period called the era of the judges winds up with the Benjamites abusing the wife of a Levite, from the effects of which she dies. Thereupon the husband cuts the body up in twelve pieces and sends one to each of the Twelve Tribes—of course through his brother Levites. War is made upon the Benjamites whereby they are nearly exterminated.

Lust, robbery, plunder, slaughter, superstition, and

barbarism marked these few centuries with little intermission.

The Levites had utilized the time in establishing the church and their priestly order, and that was actually the governing power during the four hundred and seventy-six years, but always under the name of the God of Moses, and was therefore designated the theocratic form of government.

I ask now in all seriousness, can anyone possessing a reasonable amount of understanding really believe that a God, such as Jews and Christians would make us believe that Jehova is, could behave in the manner recited in the history of the judges? It is a poor god that cannot restrain his people from committing crimes and depredations, restraining their brutal instincts and passions, keeping them in order, at peace among themselves and with others.

These intestine quarrels began in Moses's time, at the formation and organization of the Jews as a nation, and ceased only with their destruction.

The church which was called into life by Moses was firmly established during this period with all the priestly paraphernalia of an Egyptian temple. Aaron may rightly be considered as the first pope of the church, and the Levites the priestly tribe.

"And these are the garments which they shall make; a breastplate, and an ephod, and a robe, and a broidered coat, a miter, and a girdle, and they shall make holy garments for Aaron thy brother, and his sons, that he may minister unto me in the priest's office. And they shall take gold, and blue, and purple, and scarlet and fine linen" (Ex. xxviii, 4, 5). These theatrical garments we have to this day in the Christian churches. Some additions have been made,

corresponding and harmonizing with the events that have occurred since.

We must not for one moment suppose that the Hebrews were the only people that were active and struggled for existence—which existence in their case this Jehova Christendom still looks upon as most miraculous.

As a nation the Jews never invented anything. Jehova is the only thing humanity at large has inherited, and he has been a cause of quarrel and discord ever since. Joshua dies 1443 and Saul is made king 1095. Other nations during this period advance more rapidly in civilization without God, without Jehova, than the Hebrews do with his assistance. Dardanus, king of Troy, is busy building cities 1480 B.C. Danmoni invades Ireland 1463 B.C. Perseus establishes the kingdom of Mycene 1457 B.C. Crockery is made by the Greeks 1490 B.C. All kinds of tools and weapons are being made. At 1453 Olympic games are celebrated in Greece. Hercules makes his appearance and arrives in Phrygia 1225 B.C. The Trojan war begins 1194 and Helen elopes with Paris 1204 B.C. Latinus in 1239 reigns in Italy. In 1141 the temple of Ephesus is burnt by the Amazons. Many nations may be cited using dancing music. Singing had already developed. I cite these few items to show that the world was doing bravely without Jehova or God. In 1115 the Chinese not only knew of the mariner's compass, but were compiling a standard dictionary containing forty thousand characters—which is said to have been completed by Pa-aut-she 1100 B.C.

These brief statements, these few historical facts—and there are any number of them—I recite for the purpose of showing that other nations developed, other kingdoms existed, other peoples had already made considerable advances in art, science, lawmaking, government, priestcraft, without God, without Jehova, without the ark.

These other nations had their oracles, their ceremonies, their customs. And what is more, they still exist as nations. They no doubt had their wonders, their miracles, their spirits, their souls, their ghosts, their holy of holies, their sanctums, their angels, and their divinities, and whatever else has from time to time been invented to control and deceive the masses and to satisfy the priests.

What everybody should understand is that these Hebrews during the theocratic form of government were no better than, and in fact not so good as, other nations, or any of their neighbors.

The stage of civilization has never yet advanced beyond the natural capacity and capability of the people at any time. Whatever stage has been reached in the world's progress in the past, it was in harmony and corresponded with the degree of nervous culture that had been attained.

And just in proportion as the senses were developed, intelligence and understanding advanced. The senses are the sole originators of ideas. The collective experience and training of these senses becomes the standard by which we may judge the height of knowledge any class of people may have reached.

Nations kept pace with one another, copying from one another, imitating or modifying or improving those things and conditions with which they were brought in contact, whether by travel, commercial intercourse, or war. All these means of communication served as a means of exchanging ideas, of adopting, rejecting, or improving whatever degree of civilization had been attained.

At no time has any individual, community, or nation been especially favored by any supernatural endowment, influence, or miraculous contribution towards their

advancement. But each has always been improved by the force, energy, power, of some individual or individuals whose training and education has been such as to fit him or them to concentrate and carry out the ideas that have perhaps been floating for a greater or lesser time in the intellectual atmosphere. When civilization has outgrown the swaddlings of the times, something must yield. A change is sure to be effected. Although it may not take place without a struggle, or at once, ultimately it will and must attain the necessary accommodation.

Change or revolution has never yet taken place without some new ideas having been evolved. Doubts have arisen, and processes of reasoning have been set in motion, plans made, in order to upset the old ideas, to replace them by the new.

New ideas and improvements ripen slowly. The minds of men are not ready to receive and adopt them. Skepticism as to the existing state of things makes way for the newer and advanced condition of affairs.

Our understanding and reasoning faculties are limited to the state of progress and the steps that have been made in the advancement of civilization. We may be a little before our time, but never very much.

We could never have had an electric light if Volta had not discovered the battery. Nor would steam power be so generally used if the marquis of Worcester had not had the idea suggested to him A.D. 1663 of a way to drive up water by fire, etc.

Men must learn to know and understand that all knowledge, whether belonging to mythology, idolatry, fable, romance, theology, philosophy, or science—all rules adopted for our mode of conduct, either as individuals,

communities, or governments—are the products of the brain, evolved by degrees by a perfectly natural process.

And just as we advance from infancy to childhood, from childhood to youth, from youth to puberty, from puberty to manhood, from manhood to maturity, from maturity to reasoning, from reasoning to judgment, from judgment to wisdom, so humanity has gone step by step, through many thousands of centuries perhaps, slowly improving in intelligence, accumulating experience. Observing so many phenomena in nature they did not understand, it was all surprise and wonder. And not being able to account for them, in consequence of the infantile development of their nerve centers, admiration of their beauty and usefulness led to gratitude and worship. And they at length made themselves images representing these extraordinary phases. Thus idols in all probability originated. Like children with dolls, they dressed them, painted them, played with them, imitated living beings in their form and shape, endowing them with some of the best human qualities or virtues known to them.

The collection of these representations, especially the most prominent ones, formed in due time the center or focus round which fables and myths gathered. The older they grew, the more they were honored, till at length they became established institutions.

The history of the human race begins with fables, myths, childish stories, and with idols. These prevail until some one arises and either disputes their authenticity or proves them unreasonable. This tends to produce new ideas, disputes, conflicts, angry passions, and separation.

Differences of opinion concerning old ideas and methods lead to the formation of new ones, especially when the old ones cease to interest and become impracticable or

burdensome. New ideas in time take the place of the old ones, improved, modified, and adapted to the existing circumstances and conditions.

The Levites had for several centuries attempted to govern the Hebrews by means of ecclesiastical discipline, laws, and leadership, but finally discovered that it was anything but a success. Every form had been tried. They were threatened with destruction, in spite of their Jehova and the wooden Box, the ark. Some new stimulant had to be tried to bring about a more healthy condition of affairs. To consolidate the nation if possible, to infuse a new spirit, and divert ideas from discontent, turmoil, and dissension, a king was suggested. Samuel finding a very tall man who bore an excellent reputation for courage and wise conduct, one of the tribe of Benjamin, he selected him as a proper person to become king of the Jews. This man's name was Saul.

Samuel himself not only was a clever priest and prophet, but also possessed the necessary qualities to make a good general. It was he who defeated the Philistines after they had gained one victory over the Israelites and captured their ark.

During this period of their existence as a republic, an ecclesiastical republic—the theocracy, as it is called—they had to contend and struggle, and undergo many vicissitudes. It was barbarian fighting against barbarian. Regardless of their having on the one side Jehova and the ark, and on the other side Dagon & Co., the victory always remained with the best-disciplined or more numerous army, which also possessed good generalship.

## CHAPTER XIV.

# THE END OF NATIONAL LIFE.

The Hebrew monarchy established under Saul 1095 B.C., continued and cemented under David, and weakened and ruined under Solomon, terminated in the year 975 B.C., lasting altogether one hundred and twenty years.

This marks the culmination of national greatness and glory —and the rapid decline and disintegration.

We now come upon the rise of a new class of men, prophets of a new school—visionary men, dreamers and agitators, reformers—besides miracle-mongers and fault-finders. Discontent reigned. Men began to sing the glories of their past greatness, the wonders of Jehova, the miracles of Moses, and the promises that the Lord had made to their forefathers, Abraham, Isaac, and Jacob, of the land that flowed with milk and honey.

It seems almost unaccountable, even from a theological, Christian standpoint, that God, Jehova, the Lord almighty, should not be able to exhibit his wonderful powers regularly, systematically, instead of by fits and starts, on special occasions, after intervening centuries. Why should a God come and go by leaps and jumps, appearing and

disappearing at distant ages, now helping and then punishing? Why lead and mislead? Why permit people to be so foolish and senseless as to create rival gods? Why should he be jealous of a wooden god, or of any other kind of an idol?

Why should it be necessary to whip people into understanding God, knowing him? Why were there so many thousand people slaughtered to force conviction of his marvelous powers?

Is it not an outrage on common sense for a God to stoop to mountebank tricks, subterfuge, and delusion, so-called miracles, in order to establish his existence, or his presence?

If God made man, why did he not make him properly to begin with, so as to suit himself at least? Why did he not make him so as to know the father right from the start?

Why should this almighty God, this Jehova, keep his chosen people continually on the rack of transgression, crime, and folly?

Why did he create them so that they should so easily forget him, and devote their reverence, their veneration, their sacrifices, and their prayers to some brass or wooden image?

The excuse so frequently made throughout the Bible, as a reason for losing battles or being made captives, that the Jews forsook their Jehova, their God, is no extenuating circumstance. How comes it that the nations with the heathen gods were victorious and finally conquered the Hebrew nation and led them forth as captives? The heathen gods must have been equal, indeed frequently superior, to the Hebrew God, because they, the heathen gods, were so

very often victorious, and finally subdued the Hebrews.

The two nations Judah and Israel fell into idolatry almost immediately. Solomon even preferred Ashtoreth, the goddess of the Zidonians; and after Milcom, the abomination of the Ammonites (1 Kings xi, 5), and how many other strange gods we have no record.

Israel began as a kingdom 975 B.C.; Jeroboam, a servant of Solomon, was the first king and Hoshea the last; Shalmanezer, king of Assyria, took Samaria by force, and drove the Ten Tribes into Media captives, in the year 721 B.C.; this kingdom having lasted two hundred and fifty-four years, and having had during that time nineteen kings.

The kingdom of Judah lasted longer, beginning at the same time, 975 B.C. Rehoboam, the son of King Solomon, was the first king. The captivity of Judah and the destruction of Jerusalem was completed 588 B.C. Judah had existed as a nation about three hundred and eighty-seven years. Jehoiachin and Zedekiah were the last kings. During this period they had about twenty-one kings. Nebuchadnezzar, king of Babylon, made a conquest of Egypt, besieged Jerusalem, pillaged and burnt the Temple, and carried everything away that he could lay his hands on.

With few exceptions, a worse, a more brutal set of men than these rulers never governed any nation. During their successive reigns, we find an unbroken succession of the barbarities which were at that time the generally recognized method of warfare, accompanied by licentiousness, and all the other savageries of these semi-civilized people.

Prophet traffic flourished in those days. There were as many kinds of prophets as there were gods, with a complement of priests to correspond.

Religious hate and intolerance was manifest on every occasion towards one another. To gain power and control the affairs of state was the chief aim and object. They would curse and destroy one another whenever a favorable opportunity occurred.

Two religious fanatics became especially conspicuous about 918 B.C., Elijah and later Elisha. The antagonism and hostility between the leaders of factions was now very intense. Jezebel slaughtered the prophets of her opponents, and Elijah, who was the leader of the Jehova faction, cursed and raved, and many hundred prophets of Baal were slaughtered (1 Kings xviii, 19, 40). It was brutality against brutality, crime against crime, savagedom against savagedom. The bloody struggle continued right along, the slaying being employed on any and every occasion. Thus he caused the killing of the several fifties, as related in 2 Kings i. Elijah was a zealot; harsh, bitter, and merciless to the opponents of his faith. As to the miracles, they answered the purpose well enough for a lot of ignorant, half-civilized country people. We have had similar tricks repeated by priests all along, deluding, cheating, and defrauding the poor simple-minded, ignorant classes.

“And it came to pass as they still went on and talked, that behold, there appeared a chariot of fire, and horses of fire, and parted them both asunder; and Elijah went up by a whirlwind into heaven” (2 Kings ii, 11). How could a man go up to heaven? The atmosphere around this terrestrial globe is about two to three hundred miles in hight. The law of gravitation prevents the smallest particle from leaving the earth’s surface, much more a body of the weight of a man. The whirlwind belongs to the earth, and never reaches beyond a certain hight. Besides, everything taken up by a whirlwind or cloud in due time returns to mother earth. As for the horses and chariot of fire, in later days pious persons pretend to have seen similar appearances. A

man sitting before a fire fancies he sees all kinds of pictures and faces; they are the reflections of his mind. So when one fancies representations of figures and objects in the clouds, or in the moon, they are either delusions of vision, or the fancied picture of the imagination. There are delusions of hearing. An unsound condition of the nervous system may produce hallucinations of such a nature; a disease or a mental derangement may occasion this sort of nervous disturbances.

A new feature was introduced by these men—the healing art, resuscitating the supposed dead, casting out evil spirits, laying on hands, etc. A sillier piece of charlatanism was never put in print than Elisha's miraculous resuscitating trick on a child in a cataleptic fit (2 Kings iv, 34, etc.).

A craftier or more cunning piece of business was exciting Jehu, King Ahab's general, to rebel, and to slaughter the whole of the king's family. Elisha sends a young prophet to Jehu to pour oil on his head and anoint him king, on his promise to exterminate the king's family (2 Kings ix): "For the whole house of Ahab shall perish; and I will cut off from Ahab him that pisseth against the wall and him that is shut up and left in Israel" (2 Kings ix, 8).

Ahab, Jezebel, and Ahab's seventy sons were all slaughtered. All the great man's priests, and his kinsfolk, were slain. And Elisha called together all the prophets of Ahab's faction, all those that worshiped Baal, and killed them all off. General Jehu was made king as a recompense for the services he had rendered to the Elisha faction. That was about 884 B.C.

Usurpation, conspiracy, and bloody crimes mark this period. Intrigue, robbery, spoilings, lust, and degradation seem epidemic in these nations. When they were not fighting each other, they were warring with these

barbarities.

Elijah had undoubtedly a powerful party at his command when he prompted Jehu to revolt and assume the reins of government. He had everything pretty well organized when Elijah said, “And it shall come to pass, that him that escapeth Hazael shall Jehu slay; and him that escapeth from the sword of Jehu shall Elisha slay.”

“Yet I have left seven thousand in Israel, all the knees which have not bowed unto Baal” (1 Kings xix, 17, 18). These seven thousand were no doubt his immediate disciples, not the commoner herd of people.

He selected a man to succeed him, whom he no doubt knew well—a farmer, for Elisha was plowing when he was chosen as chief agitator, arch-conspirator, and inheritor of all the rights and privileges of a revolutionary leader (1 Kings xix, 20, etc.).

This plowman, prophet, and conspirator combines in himself also the healer, preacher, and leader, etc. He cures Naaman’s leprosy, causes iron to swim, brings blessings to some and curses to others.

These knavish tricks succeeded with the ignorance and superstition of the day. The people could be swayed in any direction by a clever, determined, bold talker, consequently were easily excited into the committal of any acts, no matter how revolting or brutal.

These political factions led by prophets and priests were not so gentle and polite towards one another as they are at the present day. The church ruled. Gods of either side alternately were in power. Those in power killed off those who were out of power.

Whether it is Elijah or Elisha, leaders of the Jehova party, or Queen Jezebel, leader of the Baal prophets of the other party, the result always depends upon numbers and clever leadership.

Ferocious brutality never ceases but for a short while. There is not a spark of humanity, no mercy, not an act of kindness or consideration.

Menahem was king of Israel 772 B.C. He smote Tipsha and all that were therein. "And all the women therein that were with child he ripped up" (2 Kings xv, 16).

Thus we have page after page marked with bloody crime in the book called sacred history, scripture, and what not. And alas! this is God's work, God's own book, God's own people.

Much has been said about the inaccuracies in the Bible—the contradictions, the errors that are found. We are not concerned in any of them. We are interested in directing the attention of the reader to the book called holy scripture, a book believed to have been written by supernatural inspiration, relating to certain acts done by God; and these acts, accompanied by wonders, were performed for a people especially selected by him, that were under his protection, guidance, direct supervision; and their leaders, lawgivers, kings, priests, prophets, and teachers were by reason of their holiness in communication with this God, either directly or indirectly, and thereby were endowed with powers that rendered them capable of doing things contrary to the fixed laws of nature.

We have endeavored to point to a few of the acts of the greatest and best men figuring in that book called scripture. These men were not divine nor were their acts divine. Their acts were not humane, nor anything approaching

what is understood to be humane at the present age. On the contrary, their acts were barbarous, savage, brutal, cruel, and in many instances outrageous.

They, the Hebrews, were no better than their neighbors the heathens, whatever their name or nationality might be. The heathen with their idols were just as good in war, in battle, as, if not better than, the Jews were with their God, their Jehova, and the ark, and finally succeeded in subduing the Jews, burning their Temple with God's ark, vessels, etc., taking them captives, and destroying them as a nation.

It is evident from history that the principal men of the nation were corrupt; that both the kingdom of Israel and that of Judah were rotten to the core. They were continually warring with each other, as with other nations. Their abuses gave rise to public agitators, who always found supporters.

Men of the Elijah and Elisha stamp never lose an opportunity, and they made the most of all of it while they lived.

They introduced a school of thought and action that laid the foundation for new sects that culminated in the remote future. The belief in medical miracles was more firmly fastened upon the minds of their followers by the prophets, fortune-tellers, and healers, than by any class previous.

Other nations meantime were progressing in civilization—literature, the art of warfare, etc. Greece was gaining laurels. Homer appeared. Hesiod wrote about 900 B.C. Tyrtæus's Elegies, Archilochus's Satires, etc., about 700 B.C. The Persians and Romans were rising and making rapid progress and conquest, soon to sweep smaller peoples and nations aside. These heathen made conquests, gained victories, transplanted the captives, and were

altogether far more prosperous and successful with their idols than the Hebrews were with their God. Nothing else better proves that the struggles for supremacy among the human families were perfectly natural, each side depending always on their leaders, their skill in fighting, their bravery, and their organization; that their Gods, their idols, their oracles, and their priests played but a small part in the transactions of life; and that all the gods, whether idols, or mythological, or Jehovistic, and no matter of what nationality, had all about the same material value, power, and importance.

From our modern standpoint all the gods may be classed in one category. We may safely pronounce them to be creatures of imagination, sprung into existence through ignorance, fears, and superstition. They are all alike false, frivolous, and foolish. They have not a particle of truth in them. And the Gods that are now held in such high esteem by many people, are no better than the Chaldean idols.

Judah is still struggling to retain her grip on her national life. Every effort prolongs the agony. Hezekiah is king 717 B.C. Isaiah is the prophet. Romantic dreamer, songster, critic, and man of visions, he sees distress, ruin, and misery before him; recalls the glories of the past, but sees none of the faults; sees the greatness of the nation of Solomon, David, and Saul, and now beholds the national degradation. He laments this dreadful condition with a bitterness of feeling. Then he hopes against hope that something will happen in the future that will bring about a happy state of his nation and reproduce the golden prosperity of those glittering ages that are gone. This man is a close observer, a visionary man, and a critic. He writes and sings of his own people, of his own country. In the introduction which he gives himself in Isaiah i and ii, he presents his vision concerning Judah and Jerusalem, etc. He reproaches them for their sin, iniquity, corruption, etc.:

"Your country is desolate, your cities are burned with fire; your land, strangers devour it in your presence, and it is desolate, as overthrown by strangers" (i, 7).

His dream and hope of the future: "And he shall judge among the nations, and shall rebuke many people; and they shall beat their swords into plow-shares, and their spears into pruning-hooks: nation shall not lift up sword against nation, neither shall they learn war any more" (ii, 4).

This entire chapter, like most of the chapters of Isaiah, is a work of the imagination. It is the fancy of a dreamer who mentally sees the thing he longs for. In his nervous exaltation, visions appear, incoherent, meaningless, except to himself. He brings different parts of different objects together, representing things and scenes he is familiar with, in the form of pictures, natural in parts but unnatural and impossible as a whole.

"As for my people, children are their oppressors and women rule over them" (iii, 12). He describes the "tinkling ornaments" about their feet, and their cauls and their round tires like the moon, their chains and bracelets and mufflers, the bonnets, and the ornaments of the legs, and the headbands and the tablets and the earrings, and the rings and nose-jewels, the changeable suits of apparel, and the mantles, and the wimples, and the crisping-pins, and the glasses, and the fine linen, and the hoods, and the vails, etc. This portion is no doubt realistic. It shows his mental condition and the mood he was in.

His humor changes: "Now I will sing to my well-beloved a song of my beloved touching his vineyard" (v, 1). In this chapter he touches upon everything that strikes his fancy. Hell, wind, land, instruments, lions, etc., etc., are all introduced. He rambles all over nature. Imaginary ideas are mixed with realities indiscriminately, for illustration,

comparison, lamentation, or complaining. High in the temple he sees the Lord sit; sees the seraphim with six wings, etc. (vii). And in chapter viii he has a "great roll and writes in it with a man's pen concerning Maher-shalal-hash-baz." Verse 1: "And I went to the prophetess; and she *conceived*, and had a son. Then said the Lord to me, Call his name *Maher-shalal-hash-baz*" (3).

Isaiah lived after the captivity of the Ten Tribes.

He also knows of the constant fighting between the Ten tribes and the two, Israel and Judah. Israel has been carried away captive to other lands and its country has been given to a people called Cutheans, or Samaritans. These cultivated and adopted in some measure the Jewish religion. In moments of despondency he refers to them as he refers to Moab and other nations elsewhere. The whole Christian faith seems to be based on the prophecy of the ninth chapter of Isaiah, 6th and 7th verses. Isaiah starts out in this chapter speaking of the time when God first lightly afflicted the land of Zebulon and the land of Naphtali, etc. In the 6th verse he says, "For unto us a child is born, unto us a son is given," etc. That man has no reference to Christ as Maher-shalal-hash-baz.

Chapter viii, verse 8: "And he shall pass through Judah; he shall overflow and go over, he shall reach even to the neck, and the stretching out of his wings shall fill the breadth of the land, O Immanuel." This really means the son which the prophetess conceived, and called Maher-shalal-hash-baz.

Chapter ix, verse 21: "Manasseh and Ephraim, and Ephraim and Manasseh; and they together shall be against Judah," etc. He talks in a confused, mystified fashion, alluding now to this people, now to that; at one time to the Tribes and at another to the Moabites, Assyrians, then to

Egypt or Zion; dreams of tyrants, hypocrites, and his hopes revived about the remnants of Israel. When he speaks of the child he has not the remotest dream of Christ. He has no foreknowledge, except what his judgment suggests. He feels annoyed and irritated, then his hope and aspiration soothe and comfort him, and in chapter xi he describes a most happy state of affairs: “The wolf also shall dwell with the lamb, and the leopard shall lie down with the kid, and the calf and the young lion and the fatling together, and a little child shall lead them” (verse 6). “And the cow and the bear shall feed; their young ones shall lie down together, and the lion shall eat straw like an ox” (xi, 7), etc.

The wildest and most extravagant kinds of interpretation are given to various passages in Isaiah. Into them the theologians force a meaning:

Chapter xxxv, 1: “The wilderness and the solitary place shall be glad for them and the desert shall rejoice, and blossom as the rose.” Christians say it means the joyful flourishing of Christ’s kingdom.

In chapter xliii, verse 2, Jehova declares: “I, even I, am the Lord; and beside me there is no savior.”

He repeats it in chapter xliv, verse 6: “I am the first, and I am the last, and beside me there is no God.”

Verse 8: “Is there a God beside me? yea, there is no God; I know not any.”

Chapter xlix: “Listen, O isles, unto me; and hearken ye people from afar; the Lord hath called me from the womb; from the bowels of my mother hath he made mention of my name.” This is supposed to mean, Christ being sent to the Jews complaineth of them.

Chapter lv: “Thus saith the Lord, where is the bill of your mother’s divorcement, whom I have put away? or which creditors is it to whom I have sold you? Behold! for your iniquities you have sold yourselves, and for your transgression is your mother put away.” It is said that this means, Christ sheweth that the dereliction of the Jews is not to be imputed to him, by his ability to save. This is the Christian interpretation of the above passage. It is a misrepresentation of facts as well as meaning. Why twist, torture, and falsify it?

Isaiah lived in stirring times. After the captivity of the Ten Tribes, the government and the people were corrupt. An invasion was at hand. Sennacherib invades Judea 712–711 B.C. The Medes and Assyrians were also fighting for supremacy. Being an educated man, he knew the history of his nation—their trials, the triumph and the glory they had enjoyed, and the decline of this people with its pride and pomp to a passing away. He had ample material to supply his imagination; he therefore dreamed, sang praises, saw visions, hoping for something to turn up, miraculous or otherwise, to save the remnant of his nation. He cannot be compared to the two strong, rough miracle-mongers of Israel, Elijah and Elisha, that had lived over a century before him.

This idealistic dreamer had not the slightest knowledge of coming events, of what was to happen seven hundred years later. The minds of men had slowly undergone changes.

The rigidity of the Mosaic laws had undergone some modification, and some change in interpretation as to the meaning of the many commands and usages. With every battle and with every invasion new notions, new customs, were introduced. The transition was surely laying the foundation for various schools, which was inevitable as the intelligence and education progressed.

After Isaiah Jeremiah comes, as a natural result of the age. Manasseh, king of Judah, had been carried captive to Babylon, and restored to power 677 B.C. Ammon and Josiah follow. The latter is killed, and his successor, Jehoahaz king of Judah, is deposed and carried to Egypt 609. Three years later Nebuchadnezzar conquers Jerusalem. Jehoiachin reigns three months, and he is carried off captive to Babylon, besides three thousand of the principal persons of dignity, and among these was Ezekiel (598 B.C.). Zedekiah was appointed king. He was the uncle of Jehoiachin, twenty-one years of age when he began his reign; a bad one it was, and he suffered for it. And he was the last of the kings of Judah. In 588 B.C. Jerusalem was captured and destroyed, the Temple burnt; the sons and friends of Zedekiah were slain; Zedekiah's eyes were put out, and he was bound and taken to Babylon.

Jeremiah had spoken a good many truths, and given them ample warnings what would happen. He met with a great deal of opposition—was thrown into prison and made to suffer for his boldness. His exhortations and his appeals availed nothing.

The heads of the high priests and those of the rulers were cut off. The destruction was complete.

Jeremiah wrote fifty-two chapters, and Christian interpreters managed to find two places in this entire writing that indicated Christ's kingdom:

Chapter xxiii, verse 5; "Behold the days come, saith the Lord, that I will raise unto David a righteous branch, and a king shall reign and prosper and shall execute justice and judgment in the earth"—meaning, Christ shall rule and save them.

Chapter xxxi, verse 22: "How long wilt thou go about, O

thou backsliding daughter? for the Lord hath created a new thing in the earth. A woman shall compass a man"—meaning, Christ is promised.

These are the only two spots whence any possible allusion can be drawn.

This man is unlike the visionary, romantic dreamer Isaiah, whose imagination and nervous exaltation kept him more or less in a state of excitability and carried him into regions of dreamland where his hopes and wishes were planted. Jeremiah writes up the historical occurrences; passes judgment on his own people and on the nations his people had to struggle with, bewailing their corruption, wickedness, wretchedness, misery. He never dreams of Christ or Christianity, nor does he in any part allude to Christ. He also, like Isaiah, wrote and acted in accordance with the times he lived in. He was a steadfast friend to his disciple Baruch. His lamentations describing the miserable state of Jerusalem, bewailing its calamities, are perfectly human, and perfectly natural for a patriot and a poet of his time.

Ezekiel was in Chaldea among the captives about 590 B.C. This man is also largely endowed with a prolific imagination; he is a visionary man. He adopts a new method of talking; when the word of the Lord comes to him, "Son of Man" is the manner in which he is addressed. Jeremiah uses the expression, "Sayeth the Lord," or "the word to Jeremiah from the Lord saying"——Isaiah uses, "Thus saith the Lord."

Ezekiel wrote forty-eight chapters. The following are interpreted to mean Christ:

Chapter xxxiv, verse 20: "Therefore thus saith the Lord God unto them: Behold I, even I, will judge between the

fat cattle and between the lean cattle"—meaning, the kingdom of Christ.

Chapter xxxvi, verse 25: "Then will I sprinkle clean water upon you; and ye shall be clean; from all your filthiness, and from all your idols, will I cleanse you"—meaning, the blessings of Christ's kingdom.

Chapter xxxvii, verse 20: "And the sticks whereon thou writest shall be in thine hand before their eyes"—meaning, the promises of Christ's kingdom.

The political methods of governing nations which had their origin in the ages of barbarism, ignorance, and brutality, left the rotten remnants to construct upon them a system of rules for the guidance of the masses, to control, subjugate, and restrain their mental faculties, the development and advancement of their understanding, and to perpetuate the suppression of their higher intellectual powers.

The beliefs in a God with the inferior natural human functions were handed down to us through many centuries, undergoing transitions and changes to suit the occasions, circumstances, and times.

The toning down of the Hebrew God is in the first instance mainly due to the beneficent influences of the heathen, as they were then called. The educational facilities the Jews enjoyed during their captivity were of a better and higher order, and how much of the entire book called scripture is due to these opportunities afforded them we shall never know. History teaches us, however, that Ezra, when Cyrus was king of Persia, 457 B.C., was permitted to go to Jerusalem to collect what manuscripts and data he could find, and he is credited to have written the Chronicles 453 B.C. How many more books or parts were written and compiled by Ezra and his companions will remain a

mystery.

The work of resuscitating the nation—to recover its former importance, to reëstablish some of its former glory—was attempted seventy years later, under Cyrus, who granted the Jews the privilege to return and rebuild the Temple.

They were prompted to do this out of pure motives of patriotism, and it can be regarded only as a struggle to continue to exist as a portion of a historic people. The Levites were instrumental in bringing about their return. The tribes were those belonging to the kingdom of Judah.

At this time an opposition temple and an opposition religion was established by the people of Samaria, a mixture of Cutheans and Israelites. The rivalry and hatred towards each other was as intense as the hatred and bitter factional fight had been between the Ten Tribes and the two tribes Israel and Judah.

Affairs did not succeed well. There were quarrels, wrangles, application to higher authorities to arbitrate and decide their differences and disputes. New kings, new powers, came for conquest and plunder. New leaders, new governors, deceit, treachery, rebellion, assassination, mark these centuries under Assyrians, Persians, Greeks, and Romans, until 63 B.C., when Judea was made a Roman province. Meantime new sects had organized under different names, each one giving its interpretation as to the signification of the laws contained in the books that were handed down to them. From the multiplicity of opinions, sects, factions, and fanaticisms, the already modified ideas were about to undergo a farther transition, that helped to inaugurate what might well be termed a reformation.

While this nation was crumbling to pieces other nations had advanced in civilization, in art, science, and literature,

that never claimed to have done anything under the influence of a Jehova, or any symbol representing him. These nations—Greeks, Romans, Persians—seemed to have succeeded better with mythological gods than the Jews with theirs. They had laws to govern them, which required neither smoke nor thunder to make them. Man, plain man, made them. Some were surrounded with mysterious ceremonies, symbols; others were not. Lycurgus reforms the constitution of Sparta 884 B.C. Carpets are made for tents about this time. The art of sculpture rises in Egypt. Buddha's religion is introduced into India, and an attempt is made to discover the primitive language of mankind by Psameticus; and, what is of considerable importance, children are being educated in the Grecian language and manners 660 B.C.

These facts are mentioned to show that nations that were not hampered with the Jehovistic religion, that had no miracles, wonders, or arks, were more advanced in the national sciences, had made farther progress in the general civilization of mankind, than the Hebrews. The electricity of amber was discovered by Thales, and he also taught the spherical form of the earth as the true cause of lunar eclipses, 640 B.C. Schools of learning flourished in many places. Authors appeared whose writings are classic to this day—Sappho, Alcæus, Æsop, Pittachus. Solon's legislation in Athens superseded the laws of Draco.

It was not the Mosaic God that made these people intelligent, gave them their understanding. Their enlightenment was due simply to the natural processes of the great nervous centers, independent of all supernatural interference.

The school of statuary was opened at Athens by Depoenus and Scyllis. Comedies were enacted on a cart by Susarian and Dolon. Dials were invented by Anaximander, etc.

Learning is encouraged at Athens, and a public library is founded. All this and much more occurs about 540 B.C.

Persia, too, is rapidly spreading its empire; growing powerful; progressing in wealth, commerce, and learning. Zoroaster founds his philosophy, without bloodshed, rapine, or murder.

Rome is in a nourishing condition; takes its first census 565 B.C.—811,700 citizens—spreading its empire.

We must ever bear in mind that all these nations were called heathen, and their methods of belief are looked upon by Christian teachers as much inferior to their own.

Confucius, the Chinese philosopher, is not inferior in his morality to any of the moralists of the age in which he lived, 522 B.C. And we may safely say he is equal even to the morals of to-day. Manners, methods, and fashions change, but certain principles remain.

We can examine the pages of the history of other human races and compare them with the Jews, God's own chosen race, his own people, and the heathen takes the prize in every branch of science, art, and the progress of civilization. The Hebrews for many, many centuries, with their blind infatuation with the supernatural, their constant superstitious practices of their ceremonial, their senseless devotion to an imaginary piece of extravagance, were so steeped in stupidity and ignorance that they had neither time nor inclination to observe and examine nature and its workings, so remained slaves to their preposterous practices.

Republics become fashionable. Corinth starts with her republican form of government 582 B.C., and Rome follows in abolishing a regal government and establishing

a republic 509 B.C.

The Carthaginians make a voyage to Great Britain for tin, etc.

Sophocles, Plato, Socrates, Aristophanes, and a host of renowned men rise to teach the world how to think, how to speak. Philosophy, medicine, morality, poetry, history, comedy, tragedy, arts, and science had a firm hold on the public mind. A degree of refinement both in manner and in conduct prevailed among all classes.

It was about this time that Ezra and his companions were compiling—rather collecting—fragments for composing the book of Chronicles. Other books may have been compiled or written.

Nehemiah followed Ezra. He rebuilt and repeopled Jerusalem. For all that, nothing good of a permanent character was accomplished.

Time goes on, centuries accumulate; intelligence, experience, and a higher grade of civilization appear. Nations grow more powerful. The struggle for supremacy continues, and Judah, like a shuttlecock, is thrown about from nation to nation, now under one dominion and now under another.

Religious opinions, however, are forming. They are hostile, bitter, inimical towards one another; accompanied with all the hatred, jealousy, spite, that religious differences usually engender. They are all anxious to hold office, priestly or otherwise, consequently bribery, lying, and misrepresentation are the means used to gain the influence of those in power. The rivalry between the sects makes matters no better.

The *Samaritan* sect were already in existence when Ezra returned to Jerusalem. Hostilities led to conflicts, and there was little peace between them.

In Judea there were several sects, holding various opinions. Like so many political factions, each sought control, and tried to uphold its peculiar views and interpretations.

The *Sadducees* sprang into life about 244 B.C. This sect believed that the soul dies with the body; "nor do they regard the observance of anything besides that the law enjoins them; for they think it an instance of virtue to dispute with those teachers of philosophy whom they frequent; but this doctrine is received but by few, yet by those still of greatest dignity. But they are able to do almost anything of themselves; for when they become magistrates, as they are unwillingly and by force sometimes obliged to be, they addict themselves to the notions of the Pharisees, because the multitude would not otherwise hear them" (Josephus).

This sect, one would judge, consisted of the wealthy and more enlightened class.

"The *Pharisees* live meanly, despise delicacies in diet, and they follow the contract of reason; and what that prescribes for them, as good for them, they do; and they think they ought earnestly to strive to observe reason's dictates for practice. They also pay respect to such as are in years; nor are they so bold as to contradict them in anything which they have introduced; and, when they determine that all things are done by fate, they do not take away the freedom from men of acting as they think fit; since their notion is, that it hath pleased God to make a temperament, whereby what he wills is done, but so that the will of man can act virtuously or viciously. They also believe that souls have an immortal vigour in them, and that under the earth there

will be rewards or punishments according as they have lived virtuously or viciously in this life; and the latter are to be detained in an everlasting prison, but that the former shall have power to revive and live again; on account of which doctrines they are able greatly to persuade the body of the people; and whatsoever they do about divine worship, prayers and sacrifices, they perform them according to their directions; insomuch that the cities gave great attestation to them, on account of their entire virtuous conduct, both in the actions of their lives, and of their discourse also" (Josephus).

"The doctrine of the *Essenes* is this, that all things are best ascribed to God. They teach the immortality of souls and esteem that rewards of righteousness are to be earnestly striven for, and when they send what they have dedicated to God unto the Temple, they do not offer sacrifices, because they have more pure lustrations of their own; on which account they are excluded from the common court of the Temple, but offer their sacrifices themselves; yet is their course of life better than other men; and they entirely addict themselves to husbandry. It also deserves our admiration, how much they exceed all other men that addict themselves to virtue, and this in righteousness; and indeed to such a degree that as it hath never appeared among any other men, neither Greeks nor Barbarians, no, not for a little time, so hath it endured a long while among them. This is demonstrated by that institution of theirs, which will not suffer anything to hinder them from having all things in common; so that a rich man enjoys no more of his own wealth than he that hath nothing at all. There are about four thousand men that live in this way; and neither have many wives, nor are desirous to keep servants; as thinking the latter tempts men to be unjust; but as they live by themselves, they minister one to another. They also appoint certain stewards to receive the income of their

revenues, and of the fruits of the ground; such as are good men, and priests, who are to get their coin and their food ready for them. Of a fourth sect of Jewish philosophers, Judas the Galilean was the author. These men agree in all other things with Pharisaic notions; but they have an inviolable attachment to liberty, and say that God is to be their only ruler and lord. They also do not value dying any kind of death, nor indeed do they heed the deaths of their relations and friends, nor can any such fear make them call any man Lord" (Josephus).

These matters are quoted to show the changes and modifications religious opinions were undergoing, and must have undergone for many centuries previously, until they reached the present stage.

The arguments, discussions, and reasons given, as well as the beliefs adopted, differ only in degree and kind from those when Abraham and his father dissented from the mode of worship then extant in Chaldea, some one thousand nine hundred years previous, and from the modifications introduced by Moses, the greater part of which were adopted from the Egyptians—whence the Jews really got the first taste of civilization.

These religious notions of the Jews are the opinions, simply the opinions, of a small branch of the human family. There are a great many others.

During all these centuries little or nothing was known of the natural, of the more intimate relations of nature and nature's forces. And of all nations the Jewish race knew the least. They were too much occupied with the supernatural to ever learn anything of the natural.

The supernatural idea sprang from the mire of ignorance and barbarism and savagery. Crime and outrage mark the

centuries as it rolled along in the tide of human events, halting only when forced, and renewing its current when there was nothing to bar its way—struggling madly, conquering, fighting, subduing. Life was of no value, and everything was brutally crushed under this monstrous supernatural idea, until at length it was brought to halt by superior natural forces that in time crushed and subdued it.

After one thousand four hundred years of Jehovaism, of various shades and hues, this religion emerges from the past ages to the coming centuries in a new garb, slightly improved, somewhat milder in temper, and wearing altogether a new mask, so that neither Father Abraham nor General Moses would recognize his offspring.

## CHAPTER XV.

# THE CHRISTIAN ERA.

We come to the beginning of the second two thousand years of modified Jehovaism, called the Christian era.

The Christian era, like the Chaldean-Abrahamic era, and like the Mosaic-Jehovistic era, was introduced in a mysterious manner. Both the Mosaic and the Christian were accompanied with miracles, differing in degree and intensity, as also corresponding with the changes and transitions of the times, the progress of intelligence, and the development of brain power.

If Moses had made the attempt to perform his miracles in Christ's time, he would have been hooted. He could not have deceived these masses with his tricks as he did the ignorant horde he led out of Egypt. These people had no opinion, no idea, no intelligence. They were the obedient tools and slaves of anyone who exhibited superior skill to control them and keep them in subjection, as the Catholic and Greek church make the ignorant masses subservient to their will at this day.

The small end of the wedge of science had begun to make its way into the dense solid mass of ignorance and

superstition, through the thick coating of Jehovistic supernaturalism. This thin end, however, opened a chink big enough to give us the first glimpse of the natural.

Men began to think, reason, calculate. Their past experience made them think and compare the various conditions of man and things in nature. Philosophy, arts, science, had taken root, in opposition to and in spite of any supernatural theory or any Jehovistic influence.

The natural is the proper antidote for this supernatural poison.

Greece was one of the first nations that helped to lift the heavy fog that obscured man's intellectual vision:

| | **B.C.** |
|---|---|
| Aristæus writes a treatise on conic sections, | 380 |
| Dionysius invents catapultæ, | 399 |
| Aristotle, the founder of the Peripatetics, logician and philosopher, | |
| Plato, Diogenes, Demosthenes (Philippics), etc., | 368 |
| Gausias of Sycion invents caustic painting, the art of burning colors into wood and ivory, | 335 |
| Lysistratus invents molds from which to cast wax figures, | 328 |
| The gnomon is invented or constructed to measure altitudes, | |
| Euclid of Alexandria writes his celebrated Mathematics, that has never been contradicted or modified, and is used at the present day, | 300 |

Dionysius the astronomer at Alexandria finds the solar year to consist of 365 days 5 hours and 49 minutes,

Archimedes the mathematician demonstrates the property of a lever and other mechanical powers, also the art of measuring solids and surfaces and conic sections, and constructs a planetarium,

The art of making paper and printing invented by the Chinese, 200

Attalus, king of Pergamos, introduces a book with leaves of vellum, instead of rolls,

Pasidonius calculates the hight of the atmosphere to be 800 stadia,

Scipio Nascia invents a water clock,

Hipparchus lays the foundation of trigonometry, fixes the first degree of longitude, the meridian,

These few citations I hope will be convincing proof of the progress made, thus showing that men were observing, reasoning, calculating, governed by demonstration and proof. It would have been impossible for Moses, or any other man, to perform miracles of the nature theologians believe, at the time of Christ.

Two conditions are always necessary for every miracle—profound ignorance on the one hand, and a clever fraud on the other.

There are, however, another class of miracles, that are at all times in order; that are played and plied on human failing and human weakness, always coupled with ignorance on the one side, and dishonest scoundrelism, a fraud by a priest or church mountebank, on the other.

In disturbances of nature, no one believes unless he has

ocular proof and demonstration, knowing that these things are subject to natural laws and no one man could produce an earthquake or a thunderstorm. No man could stop the current of the Mississippi river either by praying or by throwing a stick over it.

What we can do, that has the appearance of a miracle, is to play upon the susceptibilities, failings, weaknesses, and imaginations of ignorant human nature.

These cure-alls, these medical wonder-workers, these spiritual charlatans, these theological miracle-mongers, these fanatical frauds, were introduced more prominently in the Bible story by the celebrated political agitators Elijah and Elisha.

The Christian form of religion is a modification of the Hebrew, mixed with either Greek or some other of the numerous doctrines existing at that period. The hero of this reformation is brought to our notice in what is scripturally called a miraculous manner.

*Matthew* introduces the subject by saying (i, 18): “Now the birth of Jesus Christ was in this wise: When as his mother Mary was espoused to Joseph, before they came together, she was found with child of the Holy Ghost.”

We have noticed how (Gen. vi, 2) the sons of God married the daughters of men—who the lady was, the mother of these sons, we do not know, or by what process they were brought into this world.

There are instances in the Bible when prayer had the effect of producing that interesting condition on woman.

We have also the example of Eli, that fat, lascivious priest (whose sons entertained themselves behind the altar with

the ladies) who assisted Hannah when the Lord closed her womb. The Temple has served many outrageous purposes, and many amusing as well as instructive lessons might be gathered. Fortunately the Jewish Temple is no exception. The heathen temples were equally guilty.

During the reign of Tiberius, the Romans had a temple of Isis, and they had a god called Anubis. A man with the name of Mundus fell in love with a married lady called Paulina, who bribed the priests to permit him to appear to Paulina in the temple as the god Anubis. The priest representing the god Anubis invited Paulina to the temple in order to be entertained by that god. Her husband, pleased with the favor, consented. Paulina was entertained all night at the temple by what she supposed to be the god Anubis, Mundus representing him. Paulina was delighted, her husband also, but Mundus could not hold his tongue. Tiberius heard of it; he caused the temple, priests, and all to be burnt, and Mundus was exiled for three months. The priests were crucified. Anyone curious to know particulars about this matter may consult history.

In modern times, living as we do in an age of reason, fact, and science, we do not take the same view of these particular occurrences such as the Bible speaks of as our forefathers, the ancients who lived in an age of fancy and imagination. The Holy Ghost, unless he is in the substantial form of a man, can accomplish nothing, and either Mrs. Mary Joseph had committed an act of indiscretion before marriage, or Joseph himself was the father.

It would be far more decent for all parties concerned to legitimatize the child. The effect or result would be just the same, since the young gentleman is to be the great reformer of that age, clever, meek, mild, amiable as he is represented to be in the New Testament.

*Mark* begins his gospel: “The beginning of the gospel of Jesus Christ, the Son of God.”

*Luke* begins historically and then tells his virgin story (i, 27).

*John* philosophizes, and tells us that (verse 18) “no man hath seen God; the only begotten son which is in the bosom of the father, he hath declared him.” In verse 45 he is called the son of Joseph.

The entrance of Christ into this world is the most stupid and ridiculous piece of nonsense that was ever written. If Christ is the son of God he can be no relation of David, and Joseph can certainly not be his father. Or if the Holy Ghost was the cause of Mary’s condition before marriage, Joseph condoned the offense by living with her, and is the father by adoption and not by nature; and can by no means be a relation or descendant of David.

Then again, if Joseph is the father, Jesus is not the son of God. In that case, he might be a relation of David, but no relation to God.

Men of ordinary education no longer believe either in the Holy Ghost, the manner of Christ’s coming, nor in his divinity. It is an absurd fabrication, an impossibility and contrary to nature.

I repeat once more, that neither God, his spirit, nor his holy ghost, can perform anything that is in direct opposition to the laws of nature.

The miracles that are attributed to Jesus Christ by Matthew, Mark, Luke, and John are invariably of a medical nature; embracing all kinds—lepers, palsy, fevers, dropsy, the blind, the dumb, the lame—hemorrhages of

women, casting out devils, curing lunatics, healing every disease.

The manner of curing is very peculiar—by touch, by rebuke, by word, by spit and touch.

A sample or two will suffice:

Mark vii, 32: “And they bring unto him one that was deaf, and had an impediment in his speech; and they beseech him to put his hand on him.” 33: “And he took him aside from the multitude, and put his fingers into his ears, and he spit, and touched his tongue.” 34: “And looking up to heaven, he sighed, and said unto him, Ephphatha, that is, be opened.” 35: “And straightway his ears were opened, and the strings of his tongue were loosed, and he spake plain.”

Matt. xvii, 15, etc.: Christ rebukes the devil out of a lunatic.

Chapter xx, 34: He touches the eyes of two blind men and they see.

Luke viii, 43: “And a woman having an issue of blood twelve years, which had spent all her living upon physicians, neither could be healed by any.” 44: “Came behind him, and touched the borders of his garment; and immediately, her issue of blood stanched.”

Chapter viii, 54 (woman dead): “And put them all out, and took her by the hand, and called saying, Maid, arise.” 55: “And her spirit came again, and she arose straightway,” etc.

John ix, 1: “And as Jesus passed by, he saw a man, which was blind from his birth.” Verse 6: “When he had thus spoken, he spat on the ground, and made clay of the spittle,

and he anointed the eyes of the blind man with the clay."

Luke xiv, 2: He cures a man of dropsy, etc.

That these cures were actually performed is not very probable, for the simple fact that the art of medicine was little known, and least known among the Jews.

That these four witnesses really were present at the time these operations were performed, we have no proof. Luke says Christ cures blindness by touch; John makes him use spit and clay. We are not told that he was trying experiments. Anyway, every operation was successful. Raising people from the dead was equally successful.

Why should we wonder that such miracles could be performed among the lower classes, rude, uneducated, and poor? They were ready to believe any kind of plausible deception; and it was among this class that he found his adherents.

These performances called miracles are supposed to have happened nearly two thousand years ago. At that time the masses were not to be compared to the masses of to-day in education, understanding, or in the progress made in every branch of art, science, literature, mechanics, etc.

The church Christianity has also progressed somewhat, and there can be no possible excuse for the priests of to-day affirming these pretended cures of Christ. They ought to know that the notions of these things are due to feebleness of intellect in the uncultured brain, to the lack of understanding and the gullibility of the masses. Christ and his disciples were as ignorant as the masses concerning medicine or the healing art. They knew absolutely nothing about it. At 325 A.D., later 318, fathers of the then existing Christian organizations approved of the entire contents.

Nay, a large part of it may have been manufactured by them.

At this day there is no reason that men should not know better. Every man, whether priest or layman, ought to understand that so-called miraculous cures can be performed only by men, priests or others, that premeditatedly, with intent, cheat, swindle, and defraud some portion of the public, in consequence of the ignorance of the one, and the superior knowledge, shrewdness, and cunning of the other.

It is a flagrant abuse of authority, a miserable condition of our laws, a stupendous piece of bigotry, an outrage, that a man can be punished for speaking the truth, and it is an actual miracle that people are still so wonderfully stupid as to believe in the scandalous deception of the healing qualities of an old rag, a coat, pretended to have belonged to Christ or some one else. Recently we read in the daily paper, the *Sun*: "Berlin, Sept. 26.—In Treves, Herr Reichar has been sentenced to six weeks' imprisonment for ridiculing the holy coat and for attacking the Roman Catholic prelates because they encouraged the people to believe that it had healing qualities. His publisher, Herr Sonnenburg, was sentenced to three weeks' imprisonment. The chief charge against them was blasphemy."

Even in this city, some miserable cheat or cheats attempted to perpetrate the same sort of scoundrelism in one of the Catholic churches.

During the recent cholera desolation in Hamburg, we read: "In all the churches services of prayer for the abatement of the plague have been held. They have been attended by crowds which have filled the buildings" (*Sun*).

In ancient times plagues were regarded as visitations from

God; to-day we know that they are the products of filth and starvation. Sanitary measures and food for the starving are needed, instead of prayer. The churches would answer a far better purpose converted into soup-kitchens and healthy lodging-houses for the poor and homeless.

In Russia the condition is still worse. The degradation of the masses is extreme. Of the dreadful doings there we hear but the slightest echo. The Russian priest is an ignorant, intolerant, selfish, tyrannical brute. In time of cholera the clergy walk in procession through the streets in church garb, with banners, crosses, candles, chanting and praying, while the dirt, filth, and cholera poison lie all around them.

The pilgrimages to Lourdes are another ecclesiastical swindle. The poor, miserable dupes are enticed in order to be plundered. From the *Tribune*, "Zola at Lourdes," we quote: "Nothing could be more truly sensational than the annual pilgrimage thither, the flocking to that shrine of tens of thousands of devotees, dozens of special trains running to it daily; the daily processions, with thousands of priests and tens of thousands of the laity; the fervent prayers of the supplicants, and the wild exaltation of those that are miraculously healed—or who believe themselves to be healed.… So M. Zola, accompanied by Mme. Zola, were at Lourdes, and following the crowd, proceeded at once to the holy grotto. He found it surrounded by more than twenty thousand people, of both sexes and of all ages and conditions. Indeed in none of his novels is a more striking scene portrayed than that. In the afternoon the daily procession occurred. At its head marched no less than two thousand priests, monks, and nuns. Then came the holy sacrament, borne beneath a silken canopy. After it came the sick and the suffering who had come thither to be cured. These were cripples on crutches or leaning on the arms of friends; the blind, led by their friends or fellow-

pilgrims; sick and deformed infants in their mothers' arms; here and there a cripple and a blind man arm in arm, relying upon each other, the one for support, the other for guidance. Behind these thousands came other thousands of suppliants, sightseers, perhaps some scoffers, while yet other thousands stood by and gazed upon the scene."

It is indeed a miracle that we have so many such persons at this stage of progressive civilization. But the church and its priests have exerted every influence to prevent its advance.

Fortunately the world at large has outgrown this childish nonsense to some extent. The development of our civil laws, with a greater knowledge of the natural laws, keep the church and priestly fanatics in subjection.

As to the resurrection of Christ's body, or anyone else's body, we may put it down as fabulous and untrue. Dead bodies do not rise—cannot rise. From the moment a body is dead the process of decomposition begins, and resuscitation is an impossibility. No one believes it, and the priest of this century even doubts it, though the manner of Christ's birth and death forms the creed of Christian believers, and reads as follows:

"I believe in God, the father almighty, maker of heaven and earth, and in Jesus Christ his only son our Lord, who was conceived by the Holy Spirit, born of the Virgin Mary, suffered under Pontius Pilate, was crucified, dead and buried. He descended into hell; the third day he rose again from the dead; he ascended into heaven, and sitteth at the right hand of the Father, whence he shall come to judge the quick and the dead. I believe in the Holy Ghost, the Holy Catholic Church, the communion of saints, the remission of sins, the resurrection of the body, and life everlasting."

Does anyone, except the most ignorant, believe any of the

items contained in the above creed?

The men that composed the Old, and later the New Testament, may have been sincere in their belief, may have acted from pure motives, and I give them credit that their endeavors were honest, that they knew no better. They could not know the truth, have knowledge of the natural. Its forces, its capabilities, its phenomena—these were unknown to them. They erred, were mistaken in what they observed; that of itself is ample excuse for their opinions.

No such excuse exists at this present time, and no men or set of men, however organized, priestly or otherwise, should be permitted to delude and stupefy the more ignorant portion of a community.

The judge on the bench ought to know better than punish a man because he ridicules the efficacy of an old coat to cure miraculously. It is a disgrace to our civilization, and should not be tolerated.

We have a right to criticise any idea, opinion, set of opinions, or ceremonies, no matter how ancient, how originated or by whom entertained or put into practice.

We have as much right to protest against the truth or falsity of their statements, as any of our forefathers had in remote ages.

Any individual that permits his prejudices to get the better of his judgment, because he belongs to this or that church, is unfit to serve in a public capacity. The judge or magistrate that sentenced Reichar and Sonnenberg at Treves deserves to be branded as the greatest jackass that ever decorated a bench.

Ridicule is the only weapon that wipes out these shameful

practices, that helps to enlighten the masses, that elevates their thoughts and makes their understanding.

It is disgraceful enough for the ancients to have crucified Christ for his opinions, beheaded Paul for his preaching, and crucified St. Peter for his energy.

Abraham had a right to have his opinions. He differed with the Chaldeans about their gods, ridiculed them, despised them, argued, reasoned, as best he knew how. He had to leave the land of his birth for his opinions.

Moses had a right to set up his Jehova, organize a nation, and fight under his banner. He forced a success with superior numbers and superior skill.

Coming to Christ, Paul and Peter had a right to their opinions. They suffered for their opinions, yet their opinions held.

We of to-day have a right to deny the truth of their opinion. We have a right to deny any part or the whole of their doctrine, their pretensions, their errors; we have a perfect right to decline to accept their say-so for proof of anyone's having done certain things by supernatural aid. And neither church nor priest can force people to believe in their absurdities, when our reason, understanding, and common sense tell us that it is neither true nor possible.

Few men are so dull that they do not recognize the fact that it is unpleasant, as well as unprofitable, for an organized body of men, whether church or other organization, who have prospered, gained influence, control and authority over men, territory or wealth, by means of certain ideas or opinions, to be interfered with or encroached upon by a new and opposing organized body, with new ideas or opinions, lest the former might lose some of their

influence, control, or authority over men, territory, or wealth.

Selfishness and self-preservation lie at the root of this, and every aggressive movement will be hindered, checked, or prevented if possible.

## CHAPTER XVI.

# ORGANIC LIFE—VEGETABLE.

The constituent elements that enter into vegetable life consist in the main of three elementary substances. These essential elements consist of *oxygen*, *hydrogen*, and *carbon*.

The secondary elementary bodies consist of *nitrogen* and earthy elements, *sulphur* and *phosphorus*.

There are also found other elementary substances in lesser quantities in vegetable structures, as *potassium*, *sodium*, *calcium*, *magnesium*, *silicon*, *aluminium*, *iron*, *manganese*, *chlorine*, *bromine*, and *iodine*.

These are the materials of which vegetables are made. Vegetables derive all the materials of their fabric from the earth and the air. Plants can possess no simple elements which these do not supply. They may take in, to some extent, almost every element which is thus supplied. The elements above mentioned are not of universal occurrence, nor are they all components of any one vegetable tissue.

Although plants and animals have no peculiar elements; though the materials from which their bodies spring, and to

which they return, are common earth, water, and air, yet in them these elements are wrought into something widely different from any form of lifeless mineral matters, under the influence of what is usually termed the principle of life. This may be said to consist of a favorable condition brought about by the union of certain elements, under a moist atmosphere and a high temperature, combined with other powerful forces in nature.

“When this terrestrial globe began to cool the matter predominating in the atmosphere was water or its elements oxygen and hydrogen, carbonic acid and nitrogen; under the influence of a high temperature, and powerful sources of electricity, numerous combinations were produced between the elements; first carburetted hydrogen, then a nitrogenous combination, more or less analogous to the albuminous matter which we know” (Huxley).

Among the innumerable combinations nature produced, during a series of infinite ages, slowly undergoing transformation, the mixture of these substances, acting chemically upon one another, generating and regenerating at the expense of their surroundings, composed the first living being. This being was of excessive simplicity, comparable to the organisms which we call monera.

The sun’s heat acting upon these elements, and the elements acting upon one another, produced motion. Heat is motion, expansion, restrained and acting in its strife upon the smallest particles of bodies.

The principles of life were first produced by the action of the sun’s heat upon these vitalizing elements, setting them in motion, generating the required force. The surrounding condition being favorable, the simplest form of physiological life was produced. Once under the influence of what may now be termed the principle of life, in

connection with which alone such phenomena are manifested, the three or four simple constituents effected peculiar combinations, giving rise to a few organizable elements—as they are termed, because of them the organized fabric of the vegetable or animal kingdom is built up. This fabric is in a good degree similar in all living bodies; the solid parts, or tissues, in all assuming the form of membranes, arranged so as to surround cavities, or form the walls of tubes, in which fluids are contained. Such a structure is called organized structure, and the bodies so composed are called organized bodies, because such fabrics consist of parts coöperating with one another as instruments or organs adapted to certain ends, and through which alone the living principle, under whose influence the structure itself was built up, is manifested in the operations which the animal or plant carries on. There is in every organic fabric, a necessary connection between its conformation and the action it is destined to perform. This is equally true of the minute structure, or tissue, as revealed by the microscope, and of the larger organs which the tissues form in all plants and animals of the higher grades, such as a leaf, a petal, or a tendril, a hand, an eye, or a muscle. The term organization formerly referred to the possession of organs in this larger sense, that is, of conspicuous parts or membranes. It is now applied as well to the intimate structure of these parts, themselves made up of smaller organs through which the vital forces directly act.

Protoplasm, called by Huxley the basis of physical life, is nothing more than a homogeneous albuminous matter. An isolated albuminoid is not living any more than an acid or a base equally isolated is a chemically active body. But a mixture of two or several albuminous substances (a protoplasm contains at least two) might be living, similarly as a mixture of an acid and a base demonstrates the

chemical activity of the two bodies. But, whereas in the combination of an acid and a base, the formation of a new body puts an end to the dynamic manifestations of the mixture; the albuminous matter which by its union gives birth to a protoplasm, that is to say, to living matter, is capable of generating itself at the expense of the medium in which it is placed, and in proportion to the dynamic manifestations which it produces, gives birth to some rejected excreta in its midst.

Living matter may be roughly compared to an electric pile, the elements of which are capable of regenerating indefinitely. This continual exchange of the elements of living bodies and the medium in which they are placed, is one of the conditions of life. Life is the continued organization, while the molecules constituting the organized body (organism) are in a state of mobile equilibrium, or a continual renovation. A grain of vegetation, or an animal (Rotifera) slowly dried, might not manifest any vital property for a long time. Far from constituting an example opposed to our definition, it on the contrary goes to corroborate it. Whilst the chemical elements which compose it could not act one upon the other, it was necessary that they should be dissolved: *Corpora non agunt nisi sulta.* One might compare these organisms to a pile where nothing except the fluid is wanting. The eggs of certain animals (birds, etc.), that require a certain heat in order to develop completely, furnish us a case analogous to those chemical actions which could not be accomplished in a perfect manner except by a sufficient elevation of temperature.

The long discussions that have taken place in the last few years on this question, the attempted efforts to demonstrate or refute the heterogenic doctrine, have but indifferently served the purposes of science. They have made us at least to see more clearly the impotence of chemistry and

physiology alone to solve the biological problem. It is impossible for anyone to study with care the organization of the Infusoria, and even the Protista, and believe that beings so complex are formed by spontaneous generation. The size of an animal or a vegetable signifies nothing in this question. The imperfections of the micrographic investigation have alone permitted the notion of the creation of beings such as the Paramecia, the Mucidina, etc. Even in the more inferior Protista, the Bacteria, and other Schizomycites, the hypothesis of heterogeny is reversed by the simple observation that these beings present a very complicated metamorphosis. An evolution, that is to say a series of supposed forcible metamorphoses, a special condition of the germ, resulting from heredity, consequently proves a generation dependent on other than anterior organisms.

This reasoning, however, demonstrates in an unobjectionable manner that the first living beings were formed independent of all preëxisting organization, and that these beings were as little organized as possible.

The latest progress in chemistry and in biology permits us to raise the veil partly in recovering the obscure origin of living matter.

## ANIMAL-VEGETABLES, PROTISTA.

When we behold the plants and animals that ordinarily surround us, the distinction between the animal and vegetable kingdom is somehow intuitive. And it seems a loss of time and trouble to indicate the character which separates these two from each other. It is not the same

when we descend the scale of organisms. Then we arrive at an inferior region where the distinction disappears gradually, and we soon conceive the existence of a frontier zone between the animal and vegetable, a neutral territory which has been designated the kingdom of Protista.

They reproach naturalists for admitting the kingdom of Protista, accusing them of doubling the difficulty, instead of abolishing it; since it is necessary to establish a distinction between Protista, on the one part animal, on the other vegetable. That objection could be made every time they established a new division in the organic kingdom. It does not signify anything for those who know that all divisions that trench on biology are purely subjective and that nature does not bend to our strict system of classification. *Natura non facit saltus.*

All living bodies can be decomposed into visible elements under the microscope, and these have been named Plastides or Cells. That word is employed in a more general sense. The most simple Plastide is the Cytode, a simple mass of protoplasm without a nucleus or membranous envelope. A cell in a restricted meaning of the word is a Cytode presenting a nucleus, that is to say, a mass of protoplasm in the midst of which is a distinct part of the substance ambient differentiated by its aspect and its property.

1. Plants and animals are always produced under the influence of a living body similar to themselves.

2. They develop from a germ or rudiment, and run through a course of changes, to a state of maturity.

3. Plants increase by a process through which foreign materials are taken, made to permeate their interior, and deposited interstitially among the particles of the

previously existing substance; that is, they are nourished by food.

4. Plants and animals alone possess the power of assimilation, or the faculty of converting the proper foreign materials they receive into their own peculiar substance.

5. Connected with assimilation, as a part of the functions of nutrition, is a state of internal activity and unceasing change in living bodies; these constantly undergoing decomposition and recomposition, particles which have served their turn being continually thrown out of the system as new ones are brought in. This is true of both plants and animals, but more fully of the latter.

6. The duration of living beings is limited. They are developed, they reach maturity, they support themselves for a time, then perish by death sooner or later.

Mineral bodies have no life to lose, and contain no internal principle of destruction. Once formed, they exist until destroyed by some external power. They lie passive under control of physical forces.

*Life.* The great characteristic of plants and animals is life, which these beings enjoy, but minerals do not. We may safely infer that life is not a product, or result, of the organization; but is a force manifested in matter, which it controls and shapes into peculiar forms—into an apparatus, in which means are manifestly adapted to ends, by which results are reached that are in no other way attainable. As we rise in the scale of organized structure from plants through the various grades of the animal organization, the superadded vital manifestations become more and more striking and peculiar. But the fundamental characteristics of living beings—those which all enjoy in common, and which necessarily give rise to all the peculiarities above

enumerated—are reducible to two, viz.: 1. The power of self-support, that of nourishing themselves by taking in surrounding mineral matter and converting it into their own proper substance; by which individuals increase in bulk or grow, and maintain their life; 2. The power of self-division or reproduction, by which they increase in number and perpetuate the species.

A striking illustration may set both points in a strong light. The larva of the flesh-fly possesses such power of assimilation that it will increase its own weight two hundred times in twenty-four hours, and such consequent power of reproduction that Linnæus did not exaggerate when he affirmed that "Three flesh-flies would devour the carcass of a horse as quickly as a lion."

The distinction between vegetable and mineral is therefore well defined. But the line of demarcation between plants and animals is by no means so readily drawn. Ordinarily, there can be no difficulty in distinguishing a vegetable from an animal. All the questionable cases occur on the lower confines of the kingdom, which exhibit forms of the greatest simplicity of structure, and of a minuteness of size that baffles observation. Even here the uncertainty may be attributed rather to the imperfection of our knowledge, than to any confusion of the essential characteristics of the two kinds of beings (the kingdom of Protista above alluded to).

The essential characteristics of vegetables doubtless depend upon the position which the vegetable kingdom occupies between the mineral and the animal, and upon the general office it fulfills.

Plants are those organized beings that live directly upon the mineral kingdom, upon the surrounding earth, air, water. They alone convert inorganic, or mineral, into

organic matter; whilst animals originate none, but draw their whole sustenance from the organized matter which plants have thus elaborated. Plants, having thus the most intimate relations with the mineral world, are generally fixed to the earth, or other substance upon which they grow, and the mineral matter upon which they feed is taken directly into their system by absorption from without, and is assimilated under the influence of light in organs exposed to the air, while animals, endowed with volition and capable of responding promptly to external impressions, have the power of selecting the food ready prepared for their nourishment, which is received into an internal reservoir or stomach. The permanent fabric of plants is composed of only *Carbon*, *Hydrogen*, and *Oxygen*. The tissue of animals contains an additional element, viz., *Nitrogen*. Plants, as a necessary result of assimilating their inorganic food, decompose carbonic acid and restore its oxygen to the atmosphere. Animals in respiration continually recompose carbonic acid, at the expense of the oxygen of the atmosphere and the carbon of plants.

# CHAPTER XVII.

# ORGANIC LIFE—ANIMAL.

We have seen that the principal elements, the most active, that enter into the composition of plant life, that form the food substance for the support and nourishment of animals, are mainly composed of three elements, *Oxygen*, *Hydrogen*, and *Carbon*; that during evolution, growth, and development certain elements are absorbed and assimilated, while others, the gases, are exchanged. Plants yield up Oxygen and take in Carbonic acid from the atmosphere, which they store up and elaborate.

We have also seen that all the elements that enter into the composition of the various sorts of vegetation, are, chemically considered, seventeen in number.

## ANIMAL LIFE.

The animal, like the vegetable, is also composed of chemical elements, and by chemical analysis has been found to contain eighteen, as follows:

1. Of primary or vital importance: Oxygen, Hydrogen, Carbon, Nitrogen.

2. Of secondary importance, entering into the more solid structures: sulphur, phosphorus, calcium, sodium, chlorine, silicon, potassium, fluorine, magnesia, iron.

3. Accidental constituents: Magnesium, alumina, copper, and lead.

The compounds found in the body are recognized as being derived from organic and inorganic substances.

Organic substances are obtained:

1. From plants and vegetables, and are termed carbohydrates or non-nitrogenous substances, being composed of Oxygen, Carbon, and Hydrogen—as starch, sugar, etc.

2. From animals: nitrogenous substances; these compounds contain Oxygen, Hydrogen, Carbon, and Nitrogen—as meat, white of eggs; these are also termed albuminous.

3. Mineral, elements of inorganic origin, as soda, potassium, phosphorus, etc.

The more highly organized tissues found in the animal are composed of five elements, as muscle, brain, blood; these are Oxygen, Carbon, Hydrogen, Nitrogen, and sulphur.

*Albumen*, for example, exists in most of the tissues of the body, but especially in the nervous tissue, lymph, chyle, blood, etc.

*Fibrine* is found most abundantly in the blood and the more perfect portions of the lymph and chyle.

*Gelatinous* substances are contained in the cellular or fibro-cellular tissues in all parts of the body, as tendons, ligaments, cartilages, bone, skin, mucous membranes, etc.

*Chondrine* is obtained from cartilages, etc.

The general chemical composition of these substances is as follows:

| | **Albumen.** | **Fibrine.** | **Gelatine.** | **Chondrine.** |
|---|---|---|---|---|
| Carbon | 52 .5 | 52 .7 | 50 .40 | 49 .97 |
| Hydrogen | 7 .0 | 6 .9 | 6 .64 | 6 .63 |
| Nitrogen | 15 .5 | 15 .4 | 18 .34 | 14 .44 |
| Oxygen | 22 .0 | 23 .5 | | 28 .58 |
| Sulphur | 1 .6 | 1 .2 | 24 .36 | 0 .38 |
| | | | (Inorganic elements.) } | |
| Phosphorus | 0 .4 | 0 .3 | | |
| | 100 .00 | 100 .00 | 100 .00 | 100 .00 |

It will be observed that in the composition of these tissues, more than half of their constituent elements is *Carbon*. There is but a very small quantity of *Hydrogen*.

The most abundant inorganic substance in the body is water, which is composed of Oxygen one and Hydrogen two ($OH_2$). More than two-thirds of the body is made up of water.

The body is composed of various structures. Of the chief tissues of the human body, the *weight* is as follows:

| | | |
|---|---|---|
| The skeleton | 15.9 | per cent. |
| The muscles | 41.8 | ,, |
| | | ,, |
| Thoracic Viscera (lungs, heart, etc.) | 1.7 | ,, |
| | | ,, |
| Abdominal Viscera (liver, etc.) | 7.2 | ,, |
| | | ,, |
| Fat | 18.2 | ,, |
| | | ,, |
| Skin | 6.9 | ,, |
| | | ,, |
| Brain | 1.9 | ,, |
| | | ,, |

Let us examine, briefly, each of these.

*The skeleton.*—The skeleton, or solid framework of the body, is mainly formed of bones, but is completed in some parts by the addition of cartilages. The bones are bound together by means of ligaments, and are so disposed as to support the softer parts, protect delicate organs, and give attachment to the muscles by which the different movements are executed.

There are two hundred and four bones in the body:

| | |
|---|---|
| The vertebral column contains | 26 |
| The skull—cranium and face | 22 |
| The hyoid bone—bone of the tongue | 1 |
| Ribs and sternum, forming the thorax | 25 |
| The upper limbs—arms and shoulders | 64 |

| | |
|---|---|
| The lower limbs | 62 |
| Small bones, including the patella or kneecap, to the number of | 16 |

The organic constituents form about 33.3 per cent of the composition of bone, while the remainder, 66.7 per cent, is inorganic matter; as follows:

| | | |
|---|---|---|
| Organic matter (gelatine and blood-vessels) | | 33.30 |
| Inorganic substances | Phosphate of lime | 51.04 |
| | Carbonate of lime | 11.30 |
| | Fluoride of calcium | 2.00 |
| | Phosphate of magnesia | 1.16 |
| | Soda and chloride of sodium | 1.20 |

The mineral or earthy matter enters very largely into the composition of bone.

A fibrous membrane covers bone externally, and is called periosteum. The hollow bones contain marrow, composed of fat, 96 parts; water, 3; connecting tissue, 1. Bones are supplied with blood-vessels, which carry the nutritious fluid to them.

1. *The master tissues.* Primarily, it is the tissue, and not the blood, that gets loaded with carbonic acid, the latter simply receiving the gas from the former by diffusion, and the oxygen which passes from the blood into the tissues being at once taken up in some combination.

2. Nearly one-half of the weight of the body consists of the skeletal muscles, and about one-quarter of the total blood

in the body is contained in them.

3. The muscles are always producing carbonic acid ($CO_2$), and when they contract there is a sudden and extensive increase of the normal production.

4. Oxygen is necessary for the life of the muscle; it is for the nervous tissue, but for muscular tissue especially.

5. When venous blood, instead of arterial, is sent through the blood-vessel of a muscle, the irritability speedily disappears, and unless fresh oxygen is administered the muscle soon ceases to act and dies.

6. The oxidation power is determined by the tissue and by the tissue only.

7. All the available evidence goes to show that oxidation takes place in all the tissues and not in the adjoining blood.

*The master tissues of the body are the muscular and nervous tissues.* All other tissues may be regarded as the servants to these.

These tissues are the all-important tissues in the body. The muscular tissues constitute and carry out the power, force, or energy of the body. They set the body in motion. They do the work. They regulate the delicate movements of the organs of special sense or function, as the eye, the ear, the tongue, the nose, larynx, thorax, abdomen; and fighting, defending, building, destroying, labor and mechanical skill of whatever nature, depend on them. Of exercise, sport, pain and pleasure, sensation, emotion, expression of the face, in fact all in all in every act of life, the muscles, the voluntary muscles, must perform the work.

They are called the muscles of *Animal life*. They are *Voluntary*; they may be set in action at will.

For guidance, control, coördination, sensation, and motion, the muscular tissues are dependent on the nervous tissues.

It is not difficult to understand, I think, as will be explained later on, that all muscular movements are perfectly natural, purely physical and mechanical.

The nervous tissue will be a little more difficult to comprehend, for causes that are reasonable and plain.

All animals are provided with two distinct sets of organs: 1. The master tissues, the nervous and muscular tissues, the voluntary muscular tissues, which are the organs of animal life, the voluntary, the active organs that do the work, consume the food, and throw off the waste material; and 2. The servants to these, the involuntary tissues, the organs of organic life that prepare the food, carry it to the master tissues, and bring away the waste material.

The inherent qualities of both these sets of organs are *instinctive*, with this difference—the former, the *voluntary*, the controlling and working master tissues, are capable of development, progressively, acquiring intelligence, maturing into educatedness, etc.

The latter, the *involuntary*, are simply servants to these, and they perform their functions in the same manner instinctively all through life.

The muscular and nervous tissues are the educable tissue. By repetition, practice, and exercise they improve and at length exhibit certain degrees of skill in the performance of their work.

On the other hand, the organs of mastication, deglutition, digestion, absorption, excretion, circulation, and respiration simply perform their functions instinctively,

without possessing the capacity of improvement, and without regard to volition. These act involuntarily throughout life, as preparers and carriers of nourishment to the master tissues, and removers of waste material.

The work of the muscular tissues is comparatively easy to understand. We can see the work done, can account for it, can demonstrate it. The performances are capable of absolute proof, and controversy therefore is out of question.

The nervous tissues present quite another state of things. The great mass of cerebral matter, with all its complicated organs and their appendages, are hid within the cranium of the skull. We have no ocular proof of anything that is done by that structure, or of the manner in which the tissue acts. That we can see, hear, taste, and smell we know. We recognize the organs that perform these functions. Sensation, feeling, memory, thinking, cannot so easily be accounted for. Among the masses it is a mystery to-day. The doctrine of a dual existence in man is old, still it is held on to with remarkable tenacity. The church still teaches and preaches that soul or spirit is a part of some great personality or individuality not at all connected with nature—supernatural, divine, godly. This supernatural part, it is said, is placed in man some time during the process of birth. This subject will be more fully discussed farther on, in order to show what queer views theologians formerly held on some scientific subjects. I beg to quote from a Talmudistic scholar and philosopher some thousand years ago:

## PHILOSOPHICO-ANATOMICAL VIEWS OF

## A CELEBRATED HEBREW AUTHOR, AFTER TALMUDISTIC INTERPRETATION.

Jehuda ha-Levi ben Samuel, whose Arabic name was Abulhassan, considered an authority and philosopher of repute, was born in Castile 1085 A.D. He adopted medicine for his profession, but was also a traveler, philosopher, and student, and a Talmudistic scholar and writer. He wrote a book called "Sepher Hakusir: Book Kusari." It is a philosophico-theologico-scientific treatise, conducted in dialogue between himself and the king of Kusar, who became convinced of the truth of his argument and was converted to the Hebrew faith.

In the fourth part, section 25, page 246, Jehuda ha-Levi is explaining the harmonious working of the whole universe, and in evidence thereof he cites the world, soul, and year, very learnedly setting forth the mysterious working of creation, the supernatural origin and significance of the Hebrew letters, the secret and hidden meaning of their number, etc. This is based upon the principle that one rests on three, three on seven, and seven on twelve, as follows:

| *Letters*: | | A. | M. | Sh. |
|---|---|---|---|---|
| | Three Mothers, | Alof, | Mem, | Shin. |
| | World, | Air, | Water, | Fire. |
| | Man, | Chest, | Abdomen, | Head. |
| | Year, | Dampness, | Cold, | Heat. |

*Letters*: Seven double one.

| B. | G. | D. | K. | Ph. | R. | T. |
|---|---|---|---|---|---|---|
| Bet, | Gimmel, | Dalet, | Kof, | Fe, | Rosh, | Tave. |

*World*: Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon.

*Man*: Wisdom, riches, dominion, life, kindness, posterity, peace.

*Year*: The seven days in the week.

*The twelve single one letters not mentioned—Man*: Organs of hearing, seeing, smelling, speaking, tasting, begetting, dealing, walking, thinking, anger, laughing, sleeping.

*World*: The twelve Zodiacs.

"One on three and three on seven and seven on twelve. And these numbers have their functions in common one with another. For example, 'the kidneys counsel,' 'the spleen laughs,' 'the stomach sleeps,' 'the liver gets angry.' It is not to be wondered at that the kidneys have power to give counsel; we observe something similar when the testicles have been removed; one that has been castrated is weaker than a woman; the beard does not grow, and, what is more significant, the person can no longer give advice, counsel. The spleen laughs because of her natural functions, by reason of the blood being protected against the black gall and thickening and turbidity, and from this clearness, purity, nothing but brightness and joy comes. The liver is angry because of the bitterness she forms. The stomach sleeps by reason that it stands in relation with the organs of nourishment. The heart is not thought of, because it is the king. No more do they take in consideration the lungs and diaphragm, because they are necessarily so constituted to be of service to the heart; accidentally only do they serve the rest of the body, and are originally not designed to serve. The brain is under the senses, which emanate from that organ, and are thence distributed. Moreover, as to the organs that are situated below the diaphragm, therein lies a deep meaning. These

are the primary vegetations, the primary generatives. The diaphragm separates the vegetative from the animal life, as the throat separates the animal from the rational (Plato in his Timæus explains). Out of the primary generatives, out of the world vegetative, there where the root of being exists, the seed comes, and there the embryo is fashioned out of four elements. God has selected certain parts for his sacrifices—fat, blood, the peritoneum on the liver, the kidneys. On the contrary, he did not select the heart, or the brain, or the lungs, or the diaphragm. This is a deep mystery; the explanation is forbidden. Therefore the prescript, that the Jezisa is permitted to be studied only after undergoing some preparation, by few persons, and only under certain formalities," etc.

Maimonides, or Moses ben Maimon (Rambam), 1131–1205 A.D., wrote God Hazaker, the Strong Hand, a very celebrated commentary on the Talmud. He held similar views, and is also considered a very learned authority.

## THE MUSCULAR TISSUES.

The voluntary muscles are for the most part placed in close relation with the skeleton, being attached to the hard parts, and moving these in different directions by their contraction.

The muscles are all symmetrical, and with the exception of the sphincters and one or two others are in pairs. Each muscle constitutes a separate organ, composed chiefly of contractile fibrous tissue, which is called muscular, and of other tissues and parts which may be regarded as accessory. Thus muscular fibers are connected together in

bundles or fasciculi, and these fasciculi are again embedded in and united together by a quantity of connective tissue, forming the *perimysium*; and the whole is usually inclosed in an external sheath of the same material. Many of the muscles are connected at their more or less tapering extremities with tendons by which they are attached to the bones or hard parts; and the tendinous bands frequently run to a considerable length either on the surface of the muscle or between its fibers.

There are two chief kinds of muscular tissue, the *striped*, and the plain or *unstriped*, and they are distinguished by structural peculiarities and mode of action. The striped form of muscular fibers is sometimes called *voluntary* muscle, because all muscles under the control of the will are constructed of it. The plain or unstriped variety is often termed *involuntary*, because it alone is found in the greater number of muscles over which the will has no power.

The involuntary or unstriped muscles are made up of elongated, spindle-shaped *fiber cells*, which in their most perfect form are flat, from about 1⁄4500 to 1⁄3500 of an inch broad, and about 1⁄600 to 1⁄300 of an inch in length; very clear, and granular and brittle so that when they break they often have abruptly rounded or square extremities.

The *fibers* of involuntary muscles form the proper muscular coats of the digestive canal, æsophagus, urinary bladder, trachea, bronchi, gall-bladder, blood-vessels, lymphatics, etc. To this kind of fiber, muscular fiber, the term *organic* is often applied. The *sympathetic* or ganglionic portion of the nervous system, which consists of a chain of ganglia connected by nervous cords, extends from the cranium to the pelvis, along each side of the vertebral column, and from which nerves with ganglia proceed to the viscera in the thoracic, abdominal, and pelvic cavities. By its distribution, as well as by its peculiar

mode of action, this system is less immediately connected with the mind, as conducting either sensation or the impulses of the will; it is more closely connected than the cerebro-spinal system is with the processes of organic life.

The muscles of *animal life*, or *striped* muscles, include the whole class of *voluntary* muscles, the heart, and those muscles neither completely voluntary nor completely involuntary, etc. All these muscles are composed of fleshy bundles called *fasciculi*, inclosed in coverings of fibro-cellular tissue, by which each is at once connected with, and isolated from, those adjacent to it. Each bundle is again divided into smaller ones similarly ensheathed and similarly divisible; and so on, through an uncertain number of gradations, till we arrive at the *primitive fasciculi* or the muscular fibers peculiarly so called.

Muscular *fibers* consist each of a tube or sheath of delicate structureless membrane, inclosing a number of filaments or fibrils. They are of cylindrical form, or of prismatic with one or more sides, according to the manner in which they are compressed by adjacent tissues. Their average diameter is about 1⁄500 of an inch, and their length never exceeds an inch and a half.

The arrangement of the elementary substances in a muscular fiber (the sarcos element or protoplasm inclosed in the sarcolemna, the sheath) composing a muscular fiber may be compared to Volta's pile or an electric battery. In fact, both muscle and nerve are made up of electrical molecules, each of the two ends of which is negative—though the development of the electrical current is at present very imperfectly known.

Besides, there is every reason to believe that the ground substance is similar in nature to ordinary protoplasm, but without the granular character commonly but not always

exhibited.

*Blood-vessels* are largely distributed in the substance of a muscle, carrying the materials necessary for its nourishment and chemico-vital changes, and there are also lymphatic vessels as in other vascular parts of the body.

Nerves run through every muscle, by which the muscular contractions are called forth, and a low degree of muscular sensibility is conferred upon the muscular substance.

The blood-vessels of the muscular tissues are extremely abundant, so that when they are successfully filled with a colored injection the fleshy parts of the muscle contrast strongly with its tendons. The arteries, accompanied by their veins, enter the muscle at various points and divide into branches, etc.

*The nerves* of a voluntary muscle are of considerable size. Their branches pass between the fasciculi and repeatedly unite with each other in form of a plexus, which is for the most part confined to a small part of the length of the muscle, or muscular division, in which it lies.

The voluntary muscles to which distinct names have been given in the system amount to about 240, and they naturally fall under the following four great divisions (the muscles are symmetrical and with few exceptions are in pairs):

*A.* In the axial part of the body:

1. Muscles of the head and neck, 75
2. Muscles of the vertebral column and trunk, 51

*B.* In the limbs:

3. Muscles of the upper extremities, 58

4. Muscles of the lower extremities, 59

Flesh and blood have nearly the same ultimate composition. On evaporating 1000 parts of blood it yields 790 parts of water and 210 parts solid residue. The elements that enter into the composition of the solid matter are as follows:

| | **Flesh.** | **Blood.** |
|---|---|---|
| Carbon, | 51.86 | 51.96 |
| Hydrogen, | 7.58 | 7.25 |
| Nitrogen, | 15.03 | 15.07 |
| Oxygen, | 21.30 | 21.30 |
| Ashes, | 4.23 | 4.43 |

The general composition of a human muscle is shown by the following table:

| | | | |
|---|---|---|---|
| Water, | | | 744 .5 |
| Solids. | Myosin and other matters, elastic elements, etc. | 155 .4 | |
| | Soluble elements, | 19 .3 | |
| | Gelatine, | 20 .7 | |
| | Extractives, | 37 .1 | |
| | Fats, | 23 .02 | 55 .5 |

The muscles of the flesh form a large proportion of the weight of the whole body. Calculated for a man of 150 pounds' weight:

| | | |
|---|---|---|
| The skeleton, bone, | 27 | lbs. |
| The muscles, | 63 | ,, |
| The viscera, with skin, fat, blood, etc., | 60 | ,, |

*The property* of muscular tissue by which its peculiar functions are exercised, is its contractility—contraction or shortening. This is excited by all kinds of stimuli, applied either directly to the muscles, or indirectly to them through the medium of their nerves.

The muscular tissues perform all the physical work—as locomotion, every kind of action and exertion—of the body.

The quantity of blood circulated through the body is estimated to be from about 1⁄10 to about 1⁄13 part of the body's weight, and about ¼ of that is distributed in the muscles.

As regards the action of the muscles the following general principles ought to be kept in view:

1. That the force exerted by any muscle during its contraction is in proportion to the number of muscular elements or fibers composing the muscle.

2. That the extent of motion, in so far as it merely depends on the shortening of the fibers of the muscle, is in proportion to the length of the fibers.

3. That the direction of the force produced by a contracting muscle is in the line of the axis of the whole muscle if it runs straight between its opposite points of attachment, but in the line of the portion attached to the moving part of the muscle, or its tendon, if it be bent in its course, etc.

## THE CEREBRO-SPINAL SYSTEM.

*The Nervous Tissue.*

The nervous system consists of the cerebrum, pons varolii, cerebellum, medulla oblongata, the spinal cord with its nerves and the sympathetic ganglia, etc.

*The cerebrum* or brain proper constitutes the highest and much the largest portion of the encephalon. The cerebrum consists of two halves, that are connected with each other by the corpus callosum, and with the peduncular masses of the cruri cerebri, the *processus a cerebello ad cerebrum*; the series of eminences, or cerebral centers or ganglia, concealed from view, named corpora quadrigemina, optic thalamus and corpora striata, etc.

The cerebral hemispheres are by far the most bulky part of the cerebrum. Various commissural structures unite the two hemispheres, including the corpus callosum and fornix; and some smaller structures, viz., the pineal gland, the petuitary bodies, and the olfactory bulb.

The cerebral hemispheres together form an ovoid mass, in contact with the vault of the cranium, and with its smaller end forward, its greatest width being opposite to the parietal eminences. They are separated in the greater part of their extent by the great longitudinal fissure.

The surface of the hemisphere is composed of gray matter, and is molded into numerous smooth tortuous eminences, named convolutions, or gyri, which are marked off from one another by deep furrows, called sulci.

The cerebrum is divided into lobes for convenience of study, five in number, called frontal, parietal, occipital, temporal, sphenoidal, and central.

The internal structure of the cerebrum is composed of *white matter*. It consists of tubular fibers varying in size in various parts, but in general still smaller than those in the cord, their average diameter being 1⁄10000 of an inch. The fibers of white substance present no division. They are arranged in bundles, separated by a network of delicate connective tissue, consisting of cells, etc. The cells are of various forms and sizes—spheroidal, angular, fusiform, etc. The fibers radiate from the white center of each convolution in all directions into the gray cortex, having a course for the most part perpendicular to the free surface. In passing through the gray substance they are arranged in bundles about 1⁄1500 of an inch in diameter, thus separating some of the nerve cells, etc.

The olfactory tract and bulb, the corpora quadrigemina, corpora genicolate, optic thalamus, corpora striata, are all more or less mixed. They possess gray matter.

The nerves immediately connected with the brain are of several kinds. And there are twelve pairs of them. They are called cerebral nerves.

There are four kinds.

1. Nerves of special sense.

2. Nerves of common sensation.

3. Nerves of motion.

4. Mixed nerves of sensation and motion.

The nerves of special sense may with great propriety be

termed the nerves of observation, perception—the gateways of intelligence and education.

I.—Nerves of special sense:

1. The olfactory supplies the nose, special sense of smell.

2. The optic supplies the eye, special sense of sight.

3. The auditory supplies the ear, special sense of hearing.

4. Part of the glosso-pharyngeal supplies the tongue and pharynx.

5. The gustatory, lingual branch of the fifth, supplies the tongue, sense of taste.

II.—Nerves of common sensation:

1. The ophthalmic supplies the eye.

2. The superior maxillary supplies the upper jaw and teeth.

3. The inferior maxillary supplies the lower jaw and teeth.

III.—Nerves of motion:

1. The third nerve, motor acuti.
2. The fourth nerve, trochlear or pathetic.
3. The fifth, branch of fifth.
4. The sixth, abducers.

} Supply the muscles of the eye.

5. The facial nerve supplies the muscles of the face.

6. The hyperglossal supplies the muscles of the tongue.

IV.—Mixed nerves:

1. The pneumogastric supplies lungs, heart, stomach, larynx, etc.

2. The spinal accessory supplies some muscles of the back.

The average *weight* of the brain in the adult male is about 49½ ounces, a little more than three pounds avoirdupois; in the female 44 ounces; the average difference between the two being from 5 to 6 ounces.

The spinal cord has a length of about 16 to 17 inches, and weighs about 1½ ounces.

The spinal cord is a continuation of the medulla oblongata, is lodged in the spinal canal, and gives off 31 pairs of nerves, that supply all the muscles of the body with sensitive and motor nerves.

The *medulla oblongata* is pyramidal in form, having its broad extremity upwards. It is expanded laterally at its upper part. Its length from the pons varolii to the lower extremity of the pyramid is about an inch and a quarter; its greatest breadth is nearly an inch; and its thickness from before backwards is about three-quarters of an inch.

The medulla is the link between the brain and the spinal cord. The majority of centers for various organic functions are situated in it; as follows:

1. The respiratory center, with its neighboring convulsive center (venous blood excites convulsive centers, etc.). 2. The vaso-motor center. 3. The cardiac-inhibitory center. 4. The diabetic center, or center for producing artificial diabetes. 5. The center for deglutition. 6. The center for the

movements of the æsophagus, with its vomiting center. 7. The center for reflex excitation of the secretion of saliva, with which may be associated the center through which the væjus (pneumogastric) influences the secretions of pancreatic juice, and possibly of the other digestive juices. 8. The center for the dilation of the pupil by means of the cervical sympathetic.

From the surface of the medulla certain of the cranial nerves arise, namely the sixth (abducens), glosso-pharyngeal, pneumogastric, spinal accessory, etc.

The fibers from the spinal cord pass upwards through the medulla oblongata and various other structures and finally reach the cerebrum.

The *cerebellum*, or hinder brain, consists of a body, and of three pairs of crura or peduncles, by which it is connected with the rest of the cerebro-spinal axis. The cerebellum is covered with a gray cortical substance, rather darker than that of the cerebrum. Its greatest diameter is transverse, and extends to about three and a half or four inches; its width from before backwards is about two or two and a half inches; and its greatest depth is about two inches, but it is much thinner round its outer border. It consists of two lateral hemispheres joined by a median portion called the vermiform process, and other structures therewith connected, etc.

Minute structure: The cortical gray substance is composed of an external clear gray layer, an inner grayish-red "granule" layer, and between the two a single layer of large cells with long processes, termed the corpuscles of Porkinge (after the man who first described them). Outside all is the layer of fibers and vessels of the pia mater. The external layer consists of a delicate matrix, probably of the nature of connective tissue, consisting of cells and fibers,

etc.

The cerebellum is probably concerned in the coördination of movements. Its functions seem especially connected with afferent impulses proceeding from the semicircular coats.

The *spinal cord* is a cylindriform column of nerve substance connected above with the brain, through the medium of the medulla oblongata, terminating below, about the lower border of the first lumbar vertebra, in a slender filament of gray or vesicular substance, the filum terminale, which lies in the midst of knots of many nerves forming the codæ equina. Through the center of the cord, running in a longitudinal direction, is a minute canal, which is continuous through the whole length of the cord, and opens above into the space at the back of the medulla oblongata and pons varolii, called the fourth ventricle; the aqueduct of silvius connects it with the third ventricle, lateral and fifth ventricles, near the base of the brain. The cerebro-spinal fluid circulates in the interior of these ventricles and spinal cord. What precise mechanical function it subserves is only surmised, not known.

The cerebro-spinal axis is protected by three membranes, named also *meninges*. They are: 1. An external fibrous membrane, named *dura mater*, which closely lines the interior of the skull, and forms a loose sheath in the spinal canal; 2. An internal areolo-vascular tunic, the *pia mater*, which accurately covers the brain and spinal cord; and, 3. An intermediate membrane, the *arachnoid*, which lies over the pia mater, the two being in some places in close connection, and in others separated by a considerable space.

The *sympathetic nerves* are distributed in general to all the internal viscera, and to the coats of the blood-vessels.

Some organs, however, receive their nerves also from the cerebro-spinal system, as the lungs, the heart, and the upper and lower parts of the alimentary canal.

The great gangliated cords consist of two series, in each of which the ganglia are connected by intervening cords. These cords are placed symmetrically in front of the vertebral column and extend from the base of the skull to the coccyx.

With respect to the functions of the sympathetic nervous system, it may be stated generally that the sympathetic nerve fibers are simple conductors of impressions as those of the cerebro-spinal system are, and that the ganglionic centers have (each in its appropriate sphere) the like powers of conducting and of communicating impressions.

The general processes which the sympathetic appears to influence, are those of involuntary motion, secretion, and nutrition.

*Nerve centers.* This term is applied to all those parts of the nervous system which contain ganglion corpuscles, or vesicular nerve-substance—*i.e.*, the brain, spinal cord, and the several ganglia which belong to the cerebro-spinal and the sympathetic system. Each of these nervous centers has a proper range of functions, the extent of which bears a direct proportion to the number of nerve fibers that connect it with the various organs of the body, and with other nervous centers; but they all have certain general properties and modes of action common to them as nervous centers. The brain does not issue any force, except when itself impressed by some force from within, or stimulated by an impression from without; neither do the other nerve centers without such previous impressions produce or issue motor impulses.

The more certain and general office of all the nervous centers is that of variously disposing and transferring the impressions that reach them through the several centripetal fibers. In nerve fibers impressions are conducted only in the simple isolated course of the fiber; in all the nervous centers an impression may not only be conducted, but also communicated; in the brain alone it may be perceived.

In all cases in which the mind either has cognizance of, or exercises influence on, the process carried on in any part supplied with the sympathetic nerve, there must be conduction of impressions through all the nervous centers between the brain and the part. But instead of, or as well as, being conducted, impressions made on nervous centers may be *communicated* from the fibers that brought them to others, and in this communication may be either *transferred*, *diffused*, or *reflected*. Along nerve fibers impressions or conditions of excitement are simply conducted; in nerve centers they may be made to deviate from their course, and may be variously diffused, reflected, or otherwise disposed of.

*Function of nerves.* The office of nerves as simple conveyors or conductors of nervous impressions is of a twofold kind: 1. They serve to convey to the nervous centers the impressions made upon the peripheral extremities or parts of their course; 2. They serve to transmit impressions from the brain and other nervous centers to the parts to which they are distributed. For this twofold office of the nerves two distinct sets of nerve fibers are provided, in both the cerebro-spinal and sympathetic systems. Those which convey impressions from the periphery to the center are classed together as *centripetal* or *afferent nerves*, or *nerves of sensation—sensitive nerves*. Those, on the other hand, which are employed to transmit central impulses to the periphery are classed as *centrifugal* or *afferent nerves* or *motor nerves*, conveying impulses to

the voluntary and involuntary muscles, etc.

Nerves are *constructed* of minute fibers or tubules full of nervous matter, arranged in parallel or interlacing bundles, which bundles are connected by intervening connective tissue in which their principal blood-vessels ramify.

The *size* of nerve fibers varies, and the same fibers do not preserve the same diameter through their whole length, being largest in their course within their trunk and branches of nerves, in which the majority measure from 1⁄2000 to 1⁄3000 of an inch in diameter. As they approach the brain or spinal cord, and generally also in the tissue in which they are distributed, they gradually become smaller. In the gray or vesicular substance of the brain or spinal cord they generally do not measure more than from 1⁄10000 to 1⁄14000 of an inch.

The *chemical composition* of nervous matter. Like most of the other tissues of the body, the nervous substance contains a large proportion of water (from three-fourths to four-fifths of its weight). Of the residue which remains after the removal of this by evaporation or other means, the larger part consists of a phosphuretted fat, which may be obtained crystallized, and in this condition was termed protagon. The crystalline substance, however, is in reality a mixture of two other substances, *lecithin* and *neurin*. *Cerebrin* is also described as being frequently met with in conjunction with lecithin.

| | **Lecithin.** | **Neurin.** | **Cerebrin.** | **Cholestrin.** |
|---|---|---|---|---|
| Carbon, | 44 | 5 | 17 | 26 |
| Hydrogen, | 90 | 15 | 33 | 44 |
| Nitrogen, | 1 | 1 | 1 | |
| Phosphorus, | 1 | | | |

| | | | | |
|---|---|---|---|---|
| Oxygen, | 9 | 2 | 3 | 1 |

## CHAPTER XVIII.

# FOOD AND FOOD-SUBSTANCES.

There are two kinds of food: 1. Those food substances that are derived from the animal kingdom; and, 2. Food substances that are derived from the vegetable kingdom.

Food is taken into the system to replace the material expended by the human body, or the waste products which are thrown off from the master tissues.

*Definition*: Food may be defined to be any natural substance, vegetable or animal, recognized as such, that has undergone neither the process of fermentation nor that of putrefaction.

Food may be considered in its relation to two purposes—the nutrition of the tissues, and the production of heat. Under the first of these heads will be included many other allied functions, as for example, secretion and generation; and under the second, not the production of heat only as such, but of all other forces correlated with it, which are manifested by the living body.

Foods derived from the animal kingdom are called *nitrogenous* substances, or azotized. They are also known

by the name of *proteids*. These are mainly derived from meat, milk, eggs, etc. Of several we will examine the chemical composition.

It will be well to state in general terms that all food substances contain in their composition from two-thirds to three-fourths, or even more, of water—some more, some less.

*Proteids.*

| | **Albumen.** | **Caseine.** | **Syntonin.** | **Gluten.** | **Gelatine.** |
|---|---|---|---|---|---|
| Carbon, | | 72 | | | |
| Hydrogen, | | 112 | | | |
| Oxygen, | | 23 | | | |
| Nitrogen, | | 18 | | | |
| Sulphur, | | 1 | | | |
| Phosphorus, | | R. 2 | | | |

*Non-Nitrogenous Substances.*

| | **Carbon.** | **Hydrogen.** | **Oxygen.** |
|---|---|---|---|
| 1. Starch (amyloids), | 18 | 30 | 15 |
| Sugar cane, | 12 | 22 | 11 |
| 2. Oils and fats composed of stearic acid of mutton or beef, | 18 | 36 | 2 |
| 3. Mineral—Saline matters, as chloride of sodium, phosphate of lime. | | | |

Animals cannot subsist on any but organic substances, and these must contain the elements which are *naturally* combined with them—in other words, not even organic compounds are nutritive unless they are supplied in their natural state. Pure fibrine, pure gelatine, and other principles purified from the substances naturally mingled with them, are incapable of supporting life for more than a brief time. Moreover, health cannot be maintained by any number of substances derived exclusively from one only of the two chief groups of elementary principles mentioned above. A mixture of nitrogenous and non-nitrogenous organic substances, together with the inorganic principles which are severally contained in them, is essential to the well-being, and generally even to the existence, of an animal. The truth of this is demonstrated by experiments performed for the purpose; and is also well illustrated by the composition of the food prepared by nature as the exclusive source of nourishment to the young mammals, namely milk. The composition of milk is:

| | **Human.** | **Cow's.** |
|---|---|---|
| Water, | 890 | 858 |
| Solids, | 110 | 142 |
| | 1000 | 1000 |
| Caseine, | 35 | 68 |
| Butter, | 25 | 38 |
| Sugar (with extracts), | 48 | 30 |
| Salts, | 2 | 6 |
| | 110 | 142 |

**Carb. Hyd. Nit. Oxy. Sulph. R (unknown).**

| | | | | | | |
|---|---|---|---|---|---|---|
| Caseine, | 72 | 112 | 18 | 23 | 1 | 2 |

In milk, it will be seen from the preceding table, the *albuminous* group of aliments is represented by the caseine, the oleaginous by the butter, the aqueous by the water, the saccharine by the sugar of milk.

Let us compare the composition of these four organic substances and water:

| | **Oxy.** | **Hyd.** | **Carb.** | **Nitr.** | **Sulph.** | **R (unknown element).** |
|---|---|---|---|---|---|---|
| Water, | 1 | 2 | | | | |
| Sugar, $OH_2$+ | 11 | 22 | 12 | | | |
| Caseine, | 23 | 112 | 72 | 18 | 1 | 2 |
| Olein, | 6 | 38 | 21 | | | |

Among the salts of milk are phosphate of lime, alkaline and other salts, and a trace of iron; so that it may be briefly said to include all the substances which the tissues of a growing animal need for their nutrition and which are required for the production of animal heat.

The yolk and albumen of eggs stand in the same relation as food for the embryos of oviparous animals, that milk does to the young mammalia; and affords another example of mixed food being provided as the most perfect nutrition. The composition of fowl's egg is:

| | **White.** | **Yolk.** |
|---|---|---|
| Water, | 80.0 | 53.73 |
| Albumen, | 15.5 | 17.47 |

| | | | |
|---|---|---|---|
| Mucus, | 4.5 | yellow oil | 28.75 |
| Salts, | 4.0 | | 6.0 |

The *food substances*. 1. Amyloids, starch and sugars. Starch is derived from grain and vegetables, as wheat, barley, rye, oats, corn, rice, sago, tapioca, beans, peas, etc.

The vegetables contain from 75 to 90 per cent of water. Starch and sugars are derived from such as potatoes, turnips, carrots, beets, etc., etc.

The fruits are largely composed of water, sugars, and acids.

All these classes of food contain only three elements.—Starch:

| **Carbon.** | **Hydrogen.** | **Oxygen.** |
|---|---|---|
| 18 | 30 | 15 |

In their composition we have fifteen molecules of water presented carrying eighteen atoms of carbon. Sugar:

| **Carbon.** | **Hydrogen.** | **Oxygen.** |
|---|---|---|
| 12 | 22 | 11 |

In this case again we have eleven molecules of water carrying twelve atoms of carbon. This is the chemical composition of starch and sugar food.

2. Fats are also composed of three elements only—carbon, hydrogen, and oxygen. Take the fat of mutton or pork:

| Carbon. | Hydrogen. | Oxygen. |
|---|---|---|
| 21 | 40 | 1 |

All other animal oils and fats are composed of these three elements only.

3. Albuminous substances—meats, beef, mutton, veal, pork, birds, and fish, of all descriptions.

4. Besides these, mineral salts, already mentioned.

5. And lastly, water—of which by far the greatest quantity is consumed.

The quantity of food ought to be in amount sufficient to replace the waste products of the body. An amount should be taken into the system equal in kind and quantity to the material expended.

Since we know the amount of carbon, hydrogen, nitrogen, oxygen, and the salts that are excreted by the kidneys, skin, and lungs, we may easily calculate the amount of various kinds of food needed to replace them. The outcome being known, the income can be regulated accordingly.

The expenditure or waste, we have seen, in daily loss amounts in carbon to about 4,500 grains, and in nitrogen to 300 grains; besides a certain quantity of water, etc. We therefore require starchy substances, meat and fat, water, etc., to replace the quantity lost. Bread, for example, contains 30 per cent of carbon and 1 per cent of nitrogen. If bread alone, therefore, were taken as food, a man would require in order to obtain the requisite nitrogen 30,000 grains, containing of carbon, 9,000 grains; of nitrogen, 300 grains—an excess of carbon above the amount required of 4,500 grains. But a combination of bread and meat would supply much more economically what was necessary:

| | Carbon. | Nitrogen. |
|---|---|---|
| 15,000 grains of bread (rather more than 2 pounds) contains | 4,500 grs. | 150 grs. |
| 5,000 grains of meat (about ¾ pounds) contains | 500 | 150 |
| | 5,000 | 300 |

So that ¾ pounds meat and 2 pounds of bread, or its equivalent, would supply the needful carbon and nitrogen with but little waste.

From all these facts it will be plain that a mixed diet is the best and most economical for man; and the result of experience entirely coincides with what might have been anticipated on theoretical grounds only.

The quality and quantity of foods to be taken depends largely upon their digestibility.

The quantity of food necessary for a healthy man taking free exercise in the open air is as follows:

| | | | | |
|---|---|---|---|---|
| Meat | 16 | ounces or | 1 | pound avoir. |
| Bread and all other carbohydrates, | 19 | ,, ,, | 1 .19 | ,, ,, |
| Fat, butter, | 3 ½ | ,, ,, | 0 .22 | ,, ,, |
| Water | 52 | ,, ,, | 3 .38 | ,, ,, |

The quantity and quality of food taken into the system

every twenty-four hours, should depend upon the amount and kind of labor done, whether muscular or nervous, whether sitting or not, inactive or active, whether indoors or out of doors; upon the kind of atmosphere we breathe; upon season and climate, etc.; also upon the opportunities we have of throwing off the surplus carbon and nitrogen that the system has been overcrowded with.

These conditions determine the proper variations of the income, since that has to be regulated and corrected by the outcome, and amounts after all to just so much carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, saline matter, and water as are contained in the proteids, fats, carbohydrates, salts, and water.

It matters little how food is prepared. The main feature is that the supply is equal to the loss, of good and wholesome quality. Whether the food is manipulated by an artistic $10,000 cook or by a plain, clean housewife, the result is the same. Whether the special sense of taste, the gustatory nerve, has or has not undergone a high course of training and education, the fact remains that all that can be supplied is the necessary material that has been expended by the work and labor done by the muscular and nervous tissues.

The subjoined results, selected from Boussingault, exhibit in a tabular form the relative quantity of organic and inorganic constituents in several kinds of herbage compared in several cases with the root or grain. The water was previously driven off by thorough drying:

| | **Leaves of Mangel-Wurzel.** | **Root of Mangel-Wurzel.** | **Potato Tops.** | **Potatoes.** | **Pea Straw.** | **Peas.** | **Clover Hay.** | **Whea Straw** |
|---|---|---|---|---|---|---|---|---|
| Carbon | 38.10 | 42.75 | 44.80 | 43.72 | 45.80 | 46.06 | 47.53 | 48.4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Hydrogen | 5.10 | 5.77 | 5.10 | 6.00 | 5.00 | 6.09 | 4.69 | 5.4 |
| Oxygen | 30.80 | 43.58 | 30.50 | 44.88 | 35.57 | 40.53 | 37.96 | 38.7 |
| Nitrogen | 4.50 | 1.66 | 2.30 | 1.50 | 2.31 | 4.18 | 2.06 | 0.3 |
| Ashes | 21.50 | 6.24 | 3.90 | 3.90 | 11.32 | 3.14 | 7.76 | 6.9 |
| | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.0 |

Subjoined is a table from the same work of the percentage of mineral substances taken up from the soil by various plants:

| **Substances Which Yield Ashes.** | **Acids** | | | **Chlorine.** | **Lime.** | **Magnesia.** |
|---|---|---|---|---|---|---|
| | **Carbonic.** | **Sulphuric.** | **Phosphoric.** | | | |
| Potatoes | 13.4 | 7.1 | 11.3 | 2.7 | 1.8 | 5.4 |
| Mangel-Wurzel | 16.1 | 1.6 | 6.1 | 5.2 | 7.0 | 4.4 |
| Turnips | 14.0 | 10.9 | 6.0 | 2.9 | 10.9 | 4.3 |
| Potato Tops | 11.0 | 2.2 | 10.8 | 1.6 | 2.3 | 1.8 |
| Wheat | 0.0 | 1.0 | 47.0 | traces | 2.9 | 15.9 |
| Wheat Straw | 0.0 | 1.0 | 3.1 | 0.5 | 8.5 | 5.0 |
| Oats | 1.7 | 1.0 | 14.9 | 0.5 | 3.7 | 7.7 |
| Oat Straw | 3.2 | 4.1 | 3.0 | 4.7 | 8.3 | 2.8 |
| Clover | 25.0 | 2.5 | 6.3 | 2.6 | 24.6 | 6.3 |
| Pease | 0.5 | 6.7 | 30.1 | 1.1 | 10.1 | 11.9 |
| French Beans | 3.3 | 1.3 | 26.8 | 0.1 | 5.8 | 11.5 |
| Horse Beans | 1.0 | 1.6 | 34.2 | 0.7 | 5.1 | 8.6 |

## CHAPTER XIX.

# THE ELIMINATION OF WASTE SUBSTANCES.

The expenditures of the human body, or the waste products which arise from the activity of the master tissues, are thrown off by the excretory tissues, as the lungs, the skin, the kidneys, and the terminal part of the intestines.

The lungs are hollow organs, and we may consider them as really two bags containing air, each of which communicates by a separate orifice with a common air tube, through the upper part of which, the larynx, they freely communicate with the external atmosphere. The orifice of the larynx is guarded by muscles, and can be opened or closed at will.

Each lung is partially subdivided into separate portions called *lobes*. The right lung has three lobes, and the left lung has two. Each of these lobes, again, is composed of a large number of minute parts, called lobules. Each pulmonary lobule may be considered a lung in miniature, consisting as it does of a branch of a bronchial tube, air-cells, blood-vessels, nerves, and lymphatics, with a sparing amount of areolar tissue.

The terminal portion of each lobule is composed of a group of pouches or air-cells, which communicate with the intercellular air passages. These cells are of various forms, according to the mutual pressure to which they are subject. Their cell walls are nearly in contact, and they vary from 1⁄50 to 1⁄90 of an inch in diameter.

Outside the cells a network of pulmonary capillaries is spread out so densely that the interspaces or meshes are even narrower than the vessels, which are on an average 1⁄3000 of an inch in diameter.

Between the atmospheric air in the cells and the blood in the vessels nothing intervenes but the thin membrane of the cells and the capillaries, and the delicate epithelium lining the former. And the exposure of the blood to the air is the more complete because the folds of membrane between contiguous cells, and often the spaces between the walls of the same, contain only a single layer of capillaries, both sides of which are thus at once exposed to the air.

The enlargement of the capacity of the chest in inspiration is a muscular act; the muscles concerned in producing the effect being chiefly the diaphragm, the external intercostal muscles, etc.

From the enlargement produced in inspiration, the chest and lungs return in ordinary tranquil expiration by their elasticity; the force employed by the inspiratory muscles in distending the chest and overcoming the elastic resistance of the lungs and chest wall being returned as an expiratory effort when the muscles are relaxed.

The acts of expansion and of contraction of the chest take up, under ordinary circumstances, a nearly equal time, and can scarcely be said to be separated from each other by an intervening pause. The quantity of air that is changed in

the lungs in each act of ordinary tranquil breathing is variable, but probably 30 to 35 cubic inches are a fair average in the case of healthy young and middle-aged men. The total quantity of air which passes into and out of the lungs of an adult, at rest, in 24 hours, has been estimated to be about 686,000 cubic inches. This quantity is largely increased by exertion; and it has been computed that the average amount for a hard-working laborer in the same time is 1,568,390.

*Breathing air* is the quantity of air which is habitually and almost uniformly changed in each act of breathing.

*Complemental air* is the quantity of air over and above this which a man can draw into the lungs in the deepest inspiration.

After ordinary *expiration*, such as that which expels the *breathing air*, a certain quantity of air remains in the lungs which may be expelled by a forcible and deeper expiration; this is termed *reserve air*. But even after the most violent expiratory effort, the lungs are not completely emptied; a certain quantity of air remains in them, over which there is no voluntary control, which may be called *residual air*. Its amount depends, in great measure, on the absolute size of the chest, and has been variously estimated at from 40 to 200 cubic inches.

| **Power of Inspiratory Muscles.** | | **Power of Expiratory Muscles.** | |
|---|---|---|---|
| 1.5 | inches. weak | 2.0 | inches. |
| 2.0 | ordinary | 2.5 | |
| | ,, | | ,, |
| 2.5 | strong | 3.5 | |
| | ,, | | ,, |

| | | | | | |
|---|---|---|---|---|---|
| 3.5 | | very strong | 4.5 | | |
| | „ | | | „ | |
| 4.5 | | remarkable | 5.8 | | |
| | „ | | | „ | |
| 5.5 | | very | 7.0 | | |
| | „ | remarkable | | „ | |
| 6.0 | | extraordinary | 8.5 | | |
| | „ | | | „ | |
| 7.0 | | very | 10.0 | | |
| | „ | extraordinary | | „ | |

The blood as it moves through the respiratory organs is exposed to the air that alternately moves into and out of the air-cells and minute bronchial tubes. The blood is propelled from the right ventricle through the pulmonary capillaries in steady streams, and slowly enough to permit every minute portion of it to be for a few seconds exposed to the air, with only the thin walls of the capillary vessels and air-cells intervening.

The *atmosphere* we breathe has in every situation in which it has been examined in its natural state a nearly uniform composition. It is a mixture of oxygen and nitrogen, carbonic acid, and watery vapor, with traces of other gases, as ammonia, sulphuretta, hydrogen, etc. Of every 100 volumes of pure atmospheric air, 79 volumes consist of nitrogen and 21 of oxygen, about. The proportion of carbonic acid is extremely small: 10,000 volumes of atmospheric air contains only about 4 or 5 of carbonic acid. The average quantity of watery vapor in the atmosphere in this country is about 1.40 per cent.

The changes produced by respiration on the atmosphere are that: 1. It is warmed; 2. Its carbonic acid is increased; 3. Its oxygen is diminished; 4. Its watery vapor is increased; 5. A minute amount of organic matter and of free ammonia is added to it.

1. The expired air is hotter than the inspired air. The temperature varies from 97° to 99½°.

2. Carbonic acid in respired air is always increased; but the quantity exhaled in a given time is subject to change from various circumstances. From every volume of air inspired about 4½ per cent of oxygen is abstracted; while rather a smaller quantity of carbonic acid is added in its place. Under ordinary circumstances, the quantity of carbonic acid exhaled into the air breathed by a healthy adult man amounts to 1,346 inches, or about 636 grains, per hour. It is estimated that the weight of carbon excreted from the lungs is about 173 grains per hour, or rather more than 8 ounces in 24 hours.

Of course the influence of age, sex, respiratory movements, external temperature, season of the year, purity of the respired air, hygrometric state of the atmosphere, period of day, food and drink, exercise and sleep, have to be taken in consideration.

The oxygen of respired air is always less than in the same air before respiration, and its diminution is generally proportionate to the increase of the carbonic acid. It has been shown that for every volume of carbonic acid exhaled into the air 1.17421 volumes of oxygen are absorbed from it; and that when the average quantity of carbonic acid, *i.e.*, 1,346 cubic inches, or 636 grains, is exhaled in the hour, the quantity of oxygen absorbed in the same time is 1,584 cubic inches, or 542 grains.

The nitrogen in the atmosphere, in relation to the respiratory process is supposed to serve only mechanically, by diluting the oxygen, and moderating the action upon the system.

The most obvious change which the blood undergoes in its

passage through the lungs is that of *color*, the *dark venous* blood being exchanged for the bright *scarlet arterial* blood. It gains *oxygen*, loses carbonic acid, becomes 1° to 2° F. warmer; it coagulates sooner and more firmly, and contains more fibrine.

The venous blood as it issues from the right ventricle is loaded with carbonic acid. The oxygen present is insufficient to the whole of the *hæmoglobin of the red corpuscles*; much reduced hæmoglobin is present, hence the purple color of venous blood. As the blood-vessels pass through the capillaries of the lungs, this reduced hæmoglobin takes from the pulmonary air its complement of oxygen, all or nearly all the hæmoglobin of the red corpuscles becomes oxy-hæmoglobin, and the purple color forthwith shifts into scarlet. The hæmoglobin of arterial blood is saturated or nearly saturated with oxygen. Passing from the left ventricle to the capillaries, some of the oxy-hæmoglobin gives up its oxygen to the tissues, becomes reduced hæmoglobin, and the blood in consequence becomes once more venous, with a purple hue. *Thus the red corpuscles by virtue of their hæmoglobin are emphatically oxygen-carriers.* Undergoing no intrinsic change in itself, the hæmoglobin combines in the lungs with oxygen, which it carries to the tissues; these, more greedy of the oxygen than itself, rob it of its charge, and the reduced hæmoglobin hurries back to the lung in venous blood for another portion. Hæmoglobin combines loosely with carbonic oxide just as it does with oxygen, but the affinity with the former is greater than with the latter. While carbonic oxide readily turns out oxygen, oxygen cannot so readily turn out carbonic acid. This property of carbonic oxide explains its *poisonous nature*.

*Respiratory changes in the tissues.* Arterial blood passing through the several tissues, becomes once more venous. A considerable quantity of the oxy-hæmoglobin becomes

reduced, and a quantity of carbonic acid passes from the tissue into the blood. The blood which comes from a contracting muscle, is not only richer in carbonic acid, but also, though not to a corresponding amount, poorer in oxygen, than the blood which flows from a muscle at rest.

A muscle is always producing carbonic acid, and when it contracts there is a sudden and extensive increase of the normal production. *Oxygen is necessary for the life of the muscle.* When venous blood instead of arterial blood is sent through the blood-vessel of a muscle, the irritability speedily disappears, and unless fresh oxygen be administered the muscle soon dies.

Our knowledge of the respiratory changes in muscle is more complete than in the case of any other tissue; but we have no reason to suppose the phenomena of muscle are exceptional. On the contrary, all the available evidence goes to show that in all the tissues the oxidation takes place *in the tissues* and not in the adjoining blood. It is a remarkable fact, that lymph, serous fluid, bile, urine, and the other secretions contain no free or loosely combined oxygen, while the tension of carbonic acid in peritoneal fluid is as high as six per cent, and in bile and urine is still higher, etc.

All these facts point to the conclusion, that it is the *tissues*, and not the blood, which become primarily loaded with *carbonic acid*, the latter simply receiving the gas from the former by diffusion; and that the oxygen which passes from the blood into the tissues is at once taken up in the same combinations, so that it is no longer removable by diminished tension.

The production of carbonic acid in the muscle is not directly dependent on the consumption of oxygen. The muscles produce carbonic acid in an atmosphere of

hydrogen. What is true of muscle is true also of other tissues and of the body at large.

*Oxygen helps to wind up the vital clock; but once wound up, the clock will go on for a period without further winding* (Pflüger).

To sum up, then, the result of respiration in its chemical aspect. As the blood passes through the lungs, the low oxygen tension of the venous blood permits the entrance of oxygen from the air of the pulmonary alveolus, through the thin alveolar wall, through the thin capillary sheath, through the thin layer of blood plasma, to the red corpuscles, and the reduced hæmoglobin of the venous blood becomes wholly, or all but wholly, oxy-hæmoglobin. Hurried to the tissues, the oxygen, at a comparatively high tension in the arterial blood, passes largely into the tissues, in which the oxygen tension is always kept at an exceedingly low pitch, by the fact that the tissues, in some way at present unknown to us, pack away, at every moment, into some stable combination each molecule of oxygen which they receive from the blood. With much, but not all, of its oxy-hæmoglobin reduced, the blood passes on as venous blood. How much hæmoglobin is reduced will depend on the activity of the tissue itself. The quantity of hæmoglobin in the blood is the measure of limit of the oxidizing power of the body at large; but within that limit the amount of oxidation is determined by the tissue, and by the tissue alone.

*The skin* is an excretory tissue, and consists principally of two layers, an external covering of epithelium, termed the *cuticle* or *epidermis*, and a layer of vascular tissue, named the *corium derma* or *cutis vera*. The integument serves (1) for the *protection* of deeper tissues, (2) as a *sensitive organ* in the exercise of *touch*, (3) as an *excretory organ*, (4) as an *absorbing organ*, (5) for *regulating the temperature* of

the body. Within and beneath the corium are imbedded several organs with special functions, namely, *sudoriferous* or sweat glands, *sebaceous* or fat glands, and hair follicles; and on its surface are *sensitive papillæ*. The so-called appendages of the skin, the hair and nails, are modifications of the epidermis.

Sudoriferous glands: In the middle of each of the transverse furrows between the papillæ, and irregularly scattered between the bases of the papillæ in those parts of the surface of the body in which there are no furrows between them, are the orifices or ducts of the sudoriferous, or sweat glands, by which it is probable that a large portion of the aqueous and gaseous materials excreted by the skin are separated. Each of these glands consists of a small lobular mass, which appears formed of a coil of tubular gland-duct surrounded by blood-vessels and imbedded in the subcutaneous adipose tissue. From this mass the duct ascends, for a short distance, in a spiral manner through the deeper parts of the cutis, then passing straight, and then sometimes again becoming spiral, it runs through the cuticle and opens by an oblique, valve-like apparatus. The sudoriferous glands are abundantly distributed over the whole surface of the body; but are especially numerous, as well as very large, in the skin of the palm of the hand. They are estimated from 2,738 to 3,528 in each superficial square inch. They are almost equally abundant and large in the skin of the sole. The glands by which the peculiar odorous matter of the axilla is secreted form a nearly complete layer under the cutis, and are like the ordinary sudoriferous glands, except in being larger and having very short ducts. In the neck and back, where they are least numerous, the glands amount to 417 on the square inch. The total number is estimated, at 2,381,248; and supposing the orifice of each gland to present a surface of 1⁄54 of a line in diameter (and regarding a line as equal to 1⁄10 of an

inch) the whole of the glands would present an evaporating surface of about eight square inches.

*Sebaceous glands* secrete a peculiar fatty matter. Like the sudoriferous glands, they are abundantly distributed over most parts of the body.

The quantity of matter which leaves the human body by way of the skin is very considerable. It is estimated that while 7 grains pass through the lungs per minute, as much as 11 escape through the skin. The amount varies extremely. It is calculated that the total amount of perspiration excreted from the whole body in 24 hours might range from 2 to 20 kilos.

The total amount of perspiration is affected not only by the condition of the atmosphere, but also by the nature and quantity of food taken, the amount of fluid drunk, and the amount of exercise taken. It is also influenced by the mental condition, by medicines and poisons, by disease, and by the relative activity of the other excreting organs, more particularly the kidneys.

The fluid perspiration or sweat, when collected, is found to be a clear colorless fluid, with a strong and distinctive odor varying according to the part of the body from which it is taken. Besides accidental epidermic scales, it contains no structural elements. Its reaction is generally acid, but in cases of excessive secretion may become alkaline. The average amount of solids is about 1.81 per cent, of which about two-thirds consists of organic substances. The chief normal constituents are (1) sodium chloride (common salt), with small quantities of other inorganic salts; (2) various acids of the fatty series, such as fermic, acetic, butyric acid, with probably other acids—$CH_2O_2$-$C_2H_4O_2$—$C_4H_8O_2$; (3) neutral fats and cholestrine; (4) ammonia ($NH_3$) (urea), and possibly other nitrogenous substances.

The average loss by cutaneous and pulmonary exhalation in a minute is from 17 to 18 grains; the minimum, 11 grains; the maximum, 32 grains; of the average 18 grains 11 pass by the skin and 7 by the lungs. The maximum loss by exhalation, cutaneous and pulmonary, in twenty-four hours is about 3¾ pounds; the minimum, about 1½ pounds. Valentine found the whole quantity lost by exhalation from the respiratory and cutaneous surfaces of a healthy man who consumed daily 40,000 grains of food and drink to be 19,000 grains, or 2½ pounds. Subtracting from this, for the pulmonary exhalation, 5,000 grains, and for the excess of the weight of the exhaled carbonic acid over that of the equal volume of the inspired oxygen, 2,256 grains, the remainder, 11,744 grains, or nearly 1 5⁄7pounds, may represent an average amount of cutaneous exhalation in a day.

*The Kidneys*, two in number, are excretory organs. They are deeply seated in the lumbar region, one on each side of the vertebral column, at the back of the abdominal cavity, and behind the peritoneum. The kidneys measure about 4 inches in length, 2½ inches in breadth, and 1½ inches in thickness. The left is usually longer and narrower than the right one. The weight of the kidney is usually stated to be about 4½ ounces in the male and somewhat less in the female.

The excretory apparatus consists of fine tubules (the tubuli urineferi), malpighian bodies, blood-vessels, nerves, and lymphatics, etc.

The kidneys are highly vascular, and receive their blood from the renal arteries, which are very large in proportion to the organ they supply. Each artery breaks up into four or five branches, these again subdivide and break up into capillaries in the substance of the kidney. The veins arise by numerous venous radicals from the capillary network of

the kidney, as seen near the surface of the gland, and collect the blood from the capillary plexus around the convoluted tubules which mainly compose this part, the smaller veins joining together and ultimately forming a single vein and ending in the inferior vena cava.

The kidneys are so arranged by their anatomical structure —that of the cortical and medullary substance, the tubuli urineferi, pyramids, malpighian bodies, etc.—that they separate from the blood the solids in a state of solution. The secretion takes place by the agency of the gland cells, and equally in all the parts of the urine tubes. The protoplasmic cells which line at least a large portion of the tubuli urineferi elaborate from the blood certain substances, and discharge them into the channels of the tubules. All parts of the tubular system of the kidney take part in the secretion of urine as a whole, but there is another provision of vessels for a more simple draining off of the water from the blood when required.

The large size of the renal arteries and veins permits so rapid a transit of the blood through the kidneys *that the whole of the blood is purified by them*. The secretion of urine is rapid in comparison with other secretions, and as each portion is secreted, it propels that which is already in the tubes onwards into the pelvis of the kidney. Thence, through the ureter, the urine passes into the bladder, into which its rate and mode of entrance has been watched. The urine does not enter the bladder at any regular rate, nor is there a synchronism in its movement through the two ureters. In a recumbent posture the urine collects for a little time in the ureters, then flows gently, and if the body is raised, runs from them in a stream till they are empty. Its flow is increased in deep inspiration, or straining, and in active exercise, and in fifteen or twenty minutes after meals.

Substances taken into the stomach pass very rapidly through the circulation. It does not take longer than one minute for ferrocyanide of potassium to pass through. Vegetable substances pass in from sixteen to thirty-five. Neutral alkaline salts with vegetable acids, which were generally decomposed *in transitu*, made the urine alkaline in twenty-eight to forty-seven minutes. But the time of passage varied much; and the transit was always slow when the substances were taken during digestion.

There are really two distinct parts in the kidney—the actively secreting part, the epithelium of the secreting tubules; and what maybe called a filtering part, the malpighian bodies.

The specific gravity of urine is 1020—that is, the average human urine. Urine varies—in the morning before breakfast it is darker, *urina sanguinis*; urine secreted shortly after the introduction of any considerable quantity of fluid into the body, *urina potus*; and the urine evacuated immediately succeeding a solid meal of food, *urina cibi*. The last kind contains a larger quantity of solid matter than either of the others, the first and second being largely diluted with water.

Specific gravity: The morning urine is best calculated for analysis. The average healthy range may be stated at 1015 in the winter to 1025 in the summer, and variations of diet and exercise may make a great difference. In disease, the variations may be greater; sometimes descending in albuminaria to 1004, and frequently ascending in diabetes, when the urine is loaded with sugar, to 1050, or even to 1060.

The whole quantity of urine secreted in twenty-four hours is subject to variations according to the amount of fluid drunk, and the proportion of the latter passing off from

skin, lungs, and alimentary canal. The average quantity voided in twenty-four hours by healthy male adults from twenty to forty years of age amounts to 52½ fluid ounces.

The chemical composition of urine. The average quantity of each constituent of the urine in 1,000 parts is:

| | | |
|---|---|---|
| Water ($O H_2$), | | 967 |
| Urea ($C O N_2 H_4$), | | 14 .239 |
| Uric acid ($C_5 N_4 H_4 O_3$), | | .468 |
| Coloring matter, mucus, and animal extractive matter, | | 10 .107 |
| Salts. | Sulphates (soda, potash), Bisulphates (lime, soda, magnesia, ammonia), Chlorides (sodium, potassium), | 8 .185 |
| Silica, etc., | | Traces. |
| | | 1,000 .000 |

Urea is the principal solid constituent of the urine, forming nearly one-half of the whole quantity of solid matter. It is also the most important ingredient, since it is the chief substance by which the nitrogen of decomposed tissue and superfluous food is excreted from the body.

The salts excreted by the kidneys in 24 hours are:

| | | |
|---|---|---|
| Urea ($C N_2 H_4 O$), | 512 | grains. |
| Chloride of sodium (Na Cl), | 177 | ,, |
| Phosphoric acid ($H_3 P O_4$), | 48 | ,, |

| | | |
|---|---|---|
| Sulphuric acid ($H_2$ S $O_4$), | 31 .11 | ,, |
| Uric acid ($C_5$ $N_4$ $H_4$ $O_3$), | 8 .53 | ,, |

The substances excreted consist mainly of carbonic acid gas (C $O_2$), which is expired by the lungs, and urea (C $N_2$ $H_4$ O), which is expelled by the urine.

These excretions, or expenditures, or waste products of the human body, present the *carbohydrates*—starch, sugars, and fats—and the *proteids*—meats and albumen—taken into the system as food.

The daily average loss by the expenditure or waste products of the body is estimated to be about:

| | | |
|---|---|---|
| Carbon, | 4,500 | grains. |
| Nitrogen, | 3 to 500 | grains. |

Besides salts and water.

Of all the elements of the *income* and *outcome*, the *nitrogen*, the *carbon*, and the *free oxygen* of respiration, are by far the most important. Since water is of use to the body for merely mechanical purposes, and not as food in the strict sense of the word, the *hydrogen* element becomes a dubious one; the sulphur of the proteids, and phosphorus of the fats, are insignificant in amount; while the saline matters stand on a wholly different footing from the other parts of the food, inasmuch as they are not sources of energy, and pass through the body with comparatively little change.

The correct income will consist of so much *nitrogen*, *carbon*, *hydrogen*, *oxygen*, *sulphur*, *phosphorus*, saline matters, and water, contained in the proteids, fats,

carbohydrates, salts, and water of the food, together with the *oxygen* absorbed by the lungs, skin, and alimentary canal.

The *outcome* will consist of: 1. The respiratory products of the lungs, skin, and alimentary canal, consisting chiefly of carbonic acid and water, with small quantities of hydrogen and carburetted hydrogen, these two latter coming exclusively from the alimentary canal; 2. Perspiration, consisting chiefly of water and salts, with urea by the skin, and other organic constituents of sweat amounting to very little; 3. The urine, which contains practically all the nitrogen really excreted by the body, as well as a large quantity of saline matter and water.

## HEAT AND TEMPERATURE.

The average temperature of the human body in those internal parts which are more accessible, as the mouth and rectum, is from 98.5° to 99.5° F.

The chief circumstances by which the temperature of the healthy body is influenced are the following:

*Age.* The average temperature of the new-born babe is only about 1° F. above that proper to the adult. In old age the temperature rises again, and approaches that of infancy.

*Sex.* In the female slightly higher than in the male.

*Exercise.* Active exercise raises the temperature of the body, through muscular contraction, etc.

*Climate and season.* In passing from a temperate to a hot climate, the temperature of the human body rises slightly, rarely more than 2° to 3° F. In summer the temperature of the body is a little higher than in winter, ⅕° to ⅓° F.

*Cold alcoholic* drinks depress the temperature ½° to 1°F.

*Warm alcoholic* drinks, as well as warm tea and coffee, raise the temperature about ½° F.

*In disease*, as in pneumonia and typhus, it occasionally rises as high as 106° or 107° F.

*In Asiatic cholera* a thermometer placed in the mouth sometimes rises only to 77° or 79° F.

The temperature maintained by *mammalia* of an active state of life averages 101° F. In *birds*, the average is as high as 107° F., the highest temperature, 111.25°, being in the species of the linnets, etc.

*The sources and distribution of heat.* Wherever metabolism of protoplasm is going on, heat is being generated. All over the body heat is being set free; more abundantly in the more active tissues, and most of all in those tissues the metabolism of which leads to little or no external work. The metabolism of the tissues (including the blood) and of the food within the alimentary canal is the source of the heat of the body. But heat, being continually produced, is as continually being lost, as we have seen, by the skin, urine, and feces. The blood passing from one part of the body to another, and carrying warmth from the tissues where heat is being actively generated, to the tissues or organs where heat is being lost by conduction or evaporation, tends to equalize the temperature of the various parts and thus maintain a constant bodily temperature.

Taking the body as a whole, under normal conditions, the chief sources of the production of heat are the *muscles*, and the *abdominal viscera*, more especially the liver; and of these the liver deserves attention, inasmuch as it is always at work, whereas the heat produced by the muscles is at least largely dependent on their contracting, and they may remain at rest for a considerable period. The brain, too, may be regarded as a source of heat, since its temperature is higher than that of the arterial blood with which it is supplied.

Heat is lost by the skin, respiration, feces, etc. The great regulator, however, is undoubtedly the skin. The more blood passes through the skin the greater will be the loss of heat by conduction, radiation, and evaporation. The working of this heat-regulating mechanism is well seen in the case of exercise. Since every muscular contraction gives rise to heat, exercise must increase for the time being the production of heat; yet the bodily temperature rarely rises as much as a degree C., if at all. By exercise the respiration is quickened and the loss of heat by the lungs increased. The circulation of blood is also quickened, and the cutaneous vascular areas becoming dilated, a large amount of blood passes through the skin. The expenditure of heat may be tabulated thus:

| | | |
|---|---|---|
| By the skin, in conducting, radiating, and evaporating, | 77 .5 | per cent. |
| Warming expired air, | 5 .2 | ,, ,, |
| Evaporating the water of respiration, | 14 .5 | ,, ,, |
| In warming urine, etc., | 2 .6 | ,, ,, |

## THE CIRCULATION.

The heart is a hollow muscular organ divided by a longitudinal septum into a right and a left half, each of which is again subdivided by a transverse constriction into two compartments communicating with each other, and named *auricle* and *ventricle*.

The heart is inclosed in the pericardium and placed behind the sternum and costal cartilages on the border end or base, by which it is attached, being directed upwards, backwards, and to the right, and extending from the level of the fourth to that of the eighth dorsal vertebra, the apex downwards, forwards, and to the left.

In size, it is about five inches long, three and a half in its greatest width, and two in its extreme thickness from the anterior to the posterior surface. The weight is from nine to ten ounces.

*The circulation of the blood.—*

The body is divided into two chief cavities, the *chest* or *thorax*, and *abdomen*, by a curved muscular partition called the *diaphragm* or *midriff*. The chest is almost entirely filled with lungs and heart, the latter being fitted in, so to speak, between the two lungs, nearer to the front than the back of the chest, and partly overlapped by them.

In the living body the heart and lungs are in constant rhythmic movement, the result of which is an unceasing stream of air through the trachea alternately into and out of the lungs, and an unceasing stream of blood into and out of the heart.

The blood is conveyed away from the heart by the arteries and returned to it by the veins; the arteries and veins being

continuous with each other, at one end by means of the *heart*, and at the other by a fine network of vessels called *capillaries.* The blood, therefore, in its passage from the heart passes first into the arteries, then into the capillaries, and lastly into the veins, by which it is conveyed back again to the heart—thus completing a revolution, or circulation.

There are two circulations by which all the blood must pass—the one a shorter circuit from the heart to the lungs and back again, which is called the *pulmonic*; the other the larger circuit, from the heart to all parts of the body and back again, which is called the *systemic*; and a subordinate stream of blood, that has been collected by the blood-vessels of the intestines, passes by means of the portal vein through the liver, and is called the *portal circulation*.

The principal force provided for constantly moving the blood on this course, is that of the muscular substance of the heart; other assistant forces are (2) those of the elastic walls of the arteries, (3) the pressure of the muscles among which some of the veins run, (4) the movements of the walls of the chest in respiration, and (5) probably to some extent the interchange of relations between the blood and the tissues which ensues in the capillary system during the nutritive processes. The right direction of the blood's course is determined and maintained by the valves of the heart.

The heart is divided into two chief chambers or cavities—right and left. Each of these chambers is again divided into an upper and lower portion called respectively *auricle* and *ventricle*, which freely communicate with each other.

The right auricle communicates on the one hand with the veins of the general system and on the other with the right ventricle. The valvular curtain between the right auricle

and the right ventricle is named the *tricuspid*; by it the auricle is guarded from the ventricle. The ventricle leads directly into the pulmonary artery and this in turn into the lungs. The pulmonary artery is guarded by three semilunar valves. The left auricle again communicates on the one hand with the pulmonary vein and on the other with the left ventricle, which is guarded by the mitral or bicuspid valve. The left ventricle leads directly into the aorta, which is also guarded by three semilunar valves. The aorta is a large artery which conveys the blood to the general system.

The arrangement of the heart's valves is such that the blood can pass only in one definite direction, and this is—from the right auricle the blood passes into the right ventricle, and thence into the pulmonary artery, by which it is conveyed to the capillaries of the lungs. From the lungs, the blood, which is now purified and altered in color, is gathered by the pulmonary veins and taken to the left auricle. From the left auricle it passes into the left ventricle, and thence into the aorta, by which it is distributed to the capillaries in every portion of the body.

*The Heart's action.* The heart's action in propelling the blood consists in the successive alternate contractions and dilatations of the muscular walls of the two auricles and ventricles. The auricles contract simultaneously; so do the ventricles; their dilatations also are severally simultaneous; and the contractions of the one pair of cavities are synchronous with the dilatations of the other.

*Valves—Bi and Tricuspid.* During auricular contraction the force of the blood propelled into the ventricle is transmitted in all directions, but being insufficient to raise the semilunar valves, it is expended in distending the ventricle and in raising and gradually closing the auriculo-ventricular valves (tricuspid and bicuspid valves). These when the ventricle is full form a complete septum

(partition) between it and the auricle.

The arterial or semilunar valves are brought into action by the pressure of the arterial blood forced back towards the ventricles, when the elastic walls of the arteries recoil after being dilated by the blood propelled into them in the previous contraction of the ventricle.

*The sounds.* When the ear is placed over the region of the heart two sounds may be heard at every beat of the heart, which follow in quick succession, and are succeeded by a pause or a period of silence. The first sound is dull and prolonged; its commencement coincides with the *impulse* of the heart and just precedes the pulse at the wrist. The second is a shorter and sharper sound, with a somewhat flapping character, and follows close after the arterial pulse.

First sound. The chief cause of the first sound of the heart appears to be the vibration of the auriculo-ventricular valve, and also, but to a less extent, of the ventricular walls, and the coats of the aorta and pulmonary artery, all of which parts are suddenly put into a state of tension at the moment of ventricular contraction.

The second sound is more complete than that of the first. It is probably due entirely to the sudden closure and consequent vibration of the semilunar valves when they are pressed down across the orifice of the aorta and pulmonary artery.

*Pulse.* The heart of a healthy adult man in the middle period of life acts from seventy to seventy-five times per minute. The frequency of the heart's action gradually diminishes from the commencement to near the end of life.

In persons of sanguine temperament, the heart acts

somewhat more frequently than in those of the phlegmatic; and in the female sex more frequently than in the male; in children, more frequently still.

*Capacity.* The capacity of the two ventricles is probably exactly the same. From the mean of various estimates taken, it may be inferred that each ventricle is able to contain on an average about three ounces of blood, the whole of which is impelled into the respective arteries at each contraction.

Every time the ventricles contract three ounces of blood are pumped out of the heart into the lungs and heart respectively.

Calculating seventy pulses per minute, the quantity of blood passing through the heart would be about 211 ounces, or 14¼ pints per minute; or 895 pints per hour, or 21,480 pints in 24 hours.

*Velocity.* The velocity of the stream of blood is greater in the arteries than in any other part of the circulatory system, and in them it is greatest in the neighborhood of the heart and during the ventricular *systole*; the rate of movement diminishes during the *diastole* of the ventricles, and in the parts of the arterial system most distant from the heart. The rate is calculated to be about from 10 to 12 inches per second in the large arteries near the heart.

## THE BLOOD.

Blood is a tissue of which the red corpuscles are the essential and active elements, while the plasma is the

liquid matrix. There are two kinds of corpuscles, the white and the red. The protoplasm of the white corpuscles is native indifferentiated protoplasm, in no respect fitted for any special duty, as far as we know at present. The white corpuscles are in reality embryonic structures, concerned chiefly in the production of other forms, such as red corpuscles, and it may be under certain conditions various elements of the other tissues. The red corpuscles have a definite *respiratory function*. But these form a part only of the blood. The largest portion of the blood, the whole mass of the plasma, is an unorganized fluid with no proper physiological (vital) properties of its own. Its function is to serve as the great medium of exchange between all the tissues of the body. Just as the whole organism lives on the things around it, its air and its food, so the several tissues live on the complex fluid by which they are all bathed and which is to them their immediate air and food.

Blood within the living vessel is a fluid; but when shed, or after the death of the vessels, becomes solid by the process known as coagulation. The average specific gravity of human blood is 1056, varying from 1045 to 1075 within the limits of health. It has an alkaline reaction, which in shed blood rapidly diminishes up to the onset of coagulation.

Blood may, in general terms, be considered as consisting by weight of more than one-third and less than one-half of corpuscles, the rest being plasma, the corpuscles being supposed to retain the amount of water proper to them. Human blood: corpuscles 513, plasma 487. The average quantity of fibrine in the human blood is said to be two per cent.

Composition of *serum*: In 100 parts there are in round numbers:

| | | |
|---|---|---|
| Water, | 90 | parts. |
| Proteid substance, | 8 to 9 | ,, |
| Fat extractives and saline matter, | 2 to 1 | ,, |

Of the *proteid substances* the great mass consists of the so-called *serum-albumen*.

Composition of *red corpuscles*: The red corpuscles contain less water than the serum. In 100 parts of red corpuscle there are:

| | |
|---|---|
| Water, | 56.5 |
| Solid, | 43.5 |

The solids are almost entirely organic matter, the inorganic salts in the corpuscles amounting to less than 4 per cent. In 100 parts of dried organic matter of the corpuscles of human blood there are:

| | |
|---|---|
| Hæmoglobin, | 90.54 |
| Proteid substance, | 8.67 |
| Lecithin, | .54 |
| Cholestrin, | .25 |

The blood is distributed as follows in round numbers:

| | |
|---|---|
| In the heart, lungs, large arteries and veins, | About one-fourth. |

In the liver,
,,
,,
In the skeletal muscles,
,,
,,
In the other organs,
,,
,,

The average proportion of the principal constituents of the blood in 1,000 parts is:

| | |
|---|---|
| Water, | 784 |
| Red corpuscles (solid residue), | 130 |
| Albumen serum, | 70 |
| Saline matter, | 6 .03 |
| Extractive fatty matter, | 7 .77 |
| Fibrine, | 2 .20 |

The chemical composition of hæmoglobin is:

| | **Carb.** | **Hyd.** | **Iron.** | **Nit.** | **Oxy.** | **Sulph.** |
|---|---|---|---|---|---|---|
| | 54 .2 | 7 .2 | 0 .42 | 16 .0 | 21 .5 | 6 .7 |
| Mucine, | 52 .2 | 7 .0 | | 12 .6 | 28 .2 | |
| Proteids, | 51 .5 | 6 .9 | | 15 .2 | 20 .9 | 0. |
| to | 54 .5 | to 7 .3 | | to 17 .0 | to 23 .5 | to 2 .0 |

## THE ORGANS OF RESPIRATION.

The principal organs of respiration consist of larynx, trachea, bronchi, lungs.

The larynx is affixed to the upper end of the windpipe, and is not only the entrance for air into the respiratory organs from the pharynx, but also the organ of voice.

The trachea measures from four inches to four inches and a half in length, and from three-quarters of an inch to one inch in width; but its length and width are liable to continual variations, according to the position of the larynx and the direction of the neck.

The trachea divides into two branches, called bronchi, right and left. The right bronchus, wider and shorter than the left, measuring about an inch in length, passes outwards almost horizontally into the root of the right lung on a level with the fourth dorsal vertebra. The left bronchus, smaller in diameter but longer than the right, being nearly two inches in length, inclines downwards and outwards to reach the root of the right lung, which it enters on a level with the fifth dorsal vertebra—that is, about an inch lower than the right bronchus.

The lungs, placed one on the right and the other on the left of the heart and large vessels, occupy by far the larger part of the cavity of the chest, and during life are always in accurate contact with the internal surface of its walls. Each lung is attached at a comparatively small part of its flattened inner or median surface by a part named the *root* and by a thin membranous fold, which is continued downwards from it.

The pleuræ are serous membranes forming two shut sacs, quite distinct from each other, which line the right and left side of the thorax, forming by their approximation in the middle line the mediastinal partition, and are reflected each

upon the root and over the entire free surface of the corresponding lung.

The *lungs*. Each lung is irregularly pyramidal or conical, with its base downwards, and one side (the inner) much flattened. The broad concave base is of a semi-lunar form, and rests upon the arch of the diaphragm. The apex is blunt, and reaches into the root of the neck, above the first rib, where it is separated from the first portion of the subclavian artery by the pleural membrane.

The lungs vary much in size and weight, according to the quantity of blood and mucous or serous fluid they may happen to contain, which is greatly influenced by the circumstances immediately preceding death, as well as other causes. The weight of both lungs together, as generally stated, ranges from 30 to 48 ounces, the more prevalent weights being found between 36 and 42 ounces. The proportion borne by the right lung to the left is nearly 22 ounces to 20, taking the combined weight of the two at 42 ounces. The lungs are not only absolutely heavier in the male than in the female, but appear to be heavier in proportion to the weight of the body. The general ratio between the weight of the lungs and body in the adult fluctuates between one to thirty-five and one to fifty.

The average weight in twenty-nine cases, male and female:

| | **Male.** | **Female.** |
|---|---|---|
| Right lung, | 24 ounces. | 17 ounces. |
| Left lung, | 21 ,, | 15 ,, |
| | 45 ounces. | 32 ounces. |

The proportionate weight of the lungs to the body is:

| **Male.** | **Female.** |
|---|---|
| 1 to 37 | 1 to 34 |

The substance of the lungs is of a light porous spongy texture, and when healthy is buoyant in water. Specific gravity, 0.126; deprived of air, 1.056.

When pressed between the fingers, the lungs impart a crepitant sensation, which is accompanied by a peculiar noise, both effects being caused by the air contained in the tissue. On cutting the lung the same crepitation is heard.

The pulmonary tissues are endowed with great elasticity, in consequence of which the lungs collapse to about one-third of their bulk when the thorax is opened.

The root of each lung consists of bronchi, arteries, and veins, together with the nerves, lymphatic vessels, and glands, connected by areolar tissue, and inclosed in a sheath of the pleura.

Respiration consists of an expiration and an inspiration. The air passes in through the nose or mouth, through the larynx, trachea, bronchi, into the lungs.

Inspiration: By the contraction of certain muscles, the cavity of the thorax is enlarged; in consequence the pressure of the air within the lungs becomes less than that of the air outside the body, and this difference of pressure causes a rush of air through the trachea into the lungs until an equilibrium of pressure is established between the air inside and that outside the lungs. This constitutes inspiration.

Expiration: Upon the relaxation of the inspiratory muscles (the muscles whose contraction has brought about the thoracic expansion), the elasticity of the chest walls and lungs, aided by the contraction of certain muscles and other circumstances, causes the chest to return to its original size, or even become smaller. In consequence of this the pressure within the lungs now becomes greater than that outside, and thus air rushes out of the trachea, until equilibrium is once more established. This constitutes expiration.

The inspiratory and expiratory act together form a respiration.

The fresh air introduced into the upper part of the pulmonary passages by the inspiratory movement contains more *oxygen* and less carbonic acid than the old air previously present in the lungs. By diffusion the new or *tidal* air, as it is frequently called, gives up the *oxygen* to, and takes carbonic acid from, the old or *stationary* air, and thus when it leaves the chest in expiration has been the means both of introducing oxygen into and of removing carbonic acid from it. By this ebb and flow of the tidal air and the diffusion between it and the stationary air, the air in the lungs is being continually renewed, through the alternate expansion and contraction of the chest. In what may be considered normal breathing, the respiratory act is repeated about seventeen times a minute; and the duration of the inspiration as compared with that of the expiration and such pause as exists, is about as ten to twelve.

When the ordinary respiratory movements prove insufficient to effect the necessary changes in the blood, their rhythm and character become changed. Normal respiration gives place to labored respiration, and this in turn to dyspnœa, which unless some restorative event occurs terminates in asphyxia.

Changes of the air in respiration:

1. The temperature of the expired air is variable, but under ordinary circumstances is higher than that of the inspired air.

2. The expired air is loaded with aqueous vapor.

3. The expired air contains about 4 to 6 per cent less oxygen and about 4 per cent more carbonic acid than the inspired air, the quantity of nitrogen suffering but little change. Thus:

| | | **Oxygen.** | **Nitrogen.** | **Carbon.** |
|---|---|---|---|---|
| Inspired | air contains | 20 .81 | 79 .15 | .04 |
| Expired | | 16 .033 | 79 .557 | 4 .380 |
| | ,, | | | |
| | ,, | | | |

While the air in passing in and out of the lungs is thus robbed of a portion of its oxygen, and loaded with a certain quantity of carbonic acid, the blood as it streams along the pulmonary capillaries undergoes important correlative changes. As it leaves the right ventricle it is venous blood of a dark purple or maroon color; when the blood has passed through the lungs and falls into the left auricle, it is arterial blood of a bright scarlet hue. In passing through the capillaries of the body from the left to the right side of the heart, it is again changed from the arterial to the venous condition.

The average composition of this gas in the two kinds of blood is as follows. From 100 volumes may be obtained:

| | **Oxygen.** | **Carbonic Acid.** | **Nitrogen.** |
|---|---|---|---|
| Of arterial blood, | 20 (16) vol. | 39 (30) vol. | 1 to 2 vol. |
| Of venous blood, | 8–12 (6 to 10) | 46 (35) vol. | 1 to 2 vol. |

Oxygen plays a most important role on this terrestrial globe. Life, health, and food depend on it. This element penetrates, pervades, everything and everywhere, unites and disunites with all other elements, preserves and destroys. While its absence from a living being, whether plant or animal, is death.

When a liquid such as water is exposed to an atmosphere containing a gas such as oxygen, some of the oxygen will be dissolved in the water, that is to say will be absorbed from the atmosphere. The quantity which is so absorbed will depend on the quantity of oxygen which is in the atmosphere above; that is to say, on the pressure of the oxygen; the greater the pressure of the oxygen, the larger the amount which will be absorbed. If, on the other hand, water containing a good deal of oxygen dissolved in it be exposed to an atmosphere containing little or no oxygen, the oxygen will escape from the water into the atmosphere.

## CHAPTER XX.

# DIGESTION, NUTRITION.

In plant life the permanent fabric consists of only three elements—*carbon*, *hydrogen*, *oxygen*. We know that plants alone convert inorganic or mineral substances into organic matter, and that plants as a necessary result assimilate their inorganic food, decompose carbonic acid, and restore its oxygen to the atmosphere.

Vegetation is constructed of cells or vesicles, and has a cellular tissue. A cell is a living organism. It is that which makes up the tissue of plants. For the whole life of the plant is that of the cells which compose it; in them and by them its products are elaborated, and all its vital processes are carried on. Cell multiplication by division, cell growth, cell modification, exist in plants. Fluids are *transferred* from cell to cell by a process called *endosmose*. *Absorption* takes place by the roots, and the substance absorbed is carried up into the leaves, even to the topmost bough of a tree, passing in its course many millions of apparently water-tight partitions. Plants exchange gases, taking in carbonic acid and giving off oxygen. They evolve heat, have organs of reproduction, and elaborate the material for the final evolution of the seed. This seed, whether of grain, of vegetables, or of fruits, is composed of carbon,

hydrogen, and oxygen. And these constitute the starches and sugars which we find have been evolved by the vegetable or plant, and which form the food for animals. Plants, then, convert the elementary substances, the crude material, into food. In doing so, they pass through the processes known as the essentials of life; these are, birth, growth, development, decline, and death.

All organic compounds are transitory. They are constantly appearing and disappearing, composing and decomposing, organizing and disorganizing; and they are always dependent upon a certain degree of heat and moisture for their existence or non-existence.

The universal constituents of plant life; of organic existence, which are indispensable to vegetation, are *carbon*, *hydrogen*, *oxygen*, and *nitrogen*. Every vegetable substance is made up of at least eighty-eight to ninety-nine per cent of these elements. The proper vegetable structure, that is, the tissue itself, consists only of three of these elements, carbon, hydrogen, oxygen; while the fourth, nitrogen, is an essential constituent of the protoplasm, which plays so important a part in the formation of the cell, etc.

Plants prepare or elaborate out of these chemical elements food-substances composed of those elements—starches and sugars—upon which animals subsist. Animals feeding upon these vegetable substances assimilate, elaborate, them into meat substances, flesh, or proteids. These again are composed of *carbon*, *hydrogen*, *nitrogen*, and *oxygen*.

Nitrogen plays the important role in proteids, being the distinguishing feature, as contrasted with substances of vegetable origin, the carbohydrates.

Thus man is provided with two kinds of food: derived from

plants, carbohydrates; derived from animals, proteids, or albumens, besides water and mineral salts.

These foods undergo certain preparations previous to being introduced into the system. In the system the food undergoes farther elaboration, to make it fit to enter into the circulation of the blood, in order to supply suitable material for the master tissues.

We will now examine briefly the organs and their secretions that convert food-substances into blood, and, by the blood, into tissue.

The solvents and diluents of food in the human animal economy are the saliva of the mouth, the gastric juice of the stomach, the pancreative juice of the pancreas, the bile of the liver, and the juices of the intestines—the succus entericus.

The *digestive apparatus* consists mainly of the alimentary canal together with various glands of which it receives the secretions.

The *alimentary canal* commences at the mouth and terminates at the anus. The average length is about thirty feet, about five or six times the length of the body.

The part situated in the head and thorax consists of the organs of mastication, insalivation, and deglutition, and comprises the *mouth* with the teeth, the salivary glands, and the æsophagus or gullet. The parts contained in the abdomen and pelvis consist of the stomach and the small and large intestines.

The glands which are most immediately connected with digestion are very numerous small organs, situated in the mucous membrane of the alimentary canal, and the larger

glands, such as the salivary glands, pancreas, and liver, whose ducts open on its inner surface.

The *mouth* is included between the lips and the throat, bounded by the lips, cheeks, tongue, and hard and soft palate. It communicates behind with the pharynx, and through the pharynx with the æsophagus. It is lined throughout with mucous membrane.

The mouth contains 32 teeth, 16 in the upper jaw and 16 in the lower jaw. The inferior maxillary bone, or lower jaw, is the only movable bone about the head. The teeth have for their functions biting, grinding, chewing, or triturating any hard food substance that may be introduced into the mouth.

The *tongue* is a muscular organ covered with mucous membrane. By its muscular structure it takes part in the process of mastication and deglutition, and in the articulation of speech, while its mucous membrane, with common and tactile sensibility, is the seat of the sense of taste.

The *tonsils* are two prominent bodies which occupy the recesses formed, one on each side of the fauces, between the anterior and posterior palatine arches and the pillars of the fauces.

The *saliva*, which is poured into the mouth and there mixed with the food during mastication, is secreted by three pairs of glands named from their respective situation *parotid*, *submaxillary*, and *sublingual*.

The *parotid* is the largest of three salivary glands. It lies on the side of the face, in front of the ear, and extends deeply into the space behind the ramus of the lower jaw. Its weight varies from 5 to 8 drachms. It has a duct called the parotid or Stenson’s duct. It is about 2½ inches long, and

about a line and a half in thickness. Its orifice is opposite the crown of the second molar tooth of the upper jaw.

The *submaxillary* gland weighs about 2 to 2½ drachms, and is situated on the inner surface of the inferior maxillary. The duct is named Wharton's, and is about 2 inches in length. Its orifice is found under the tongue.

The *sublingual* gland weighs about a drachm. It is situated on the floor of the mouth. The ducts are called the ducti Rivintiani. They are from 8 to 20 in number. They may be seen when the tip of the tongue is lifted up.

*Saliva.* Mixed saliva, as it appears in the mouth, is a thick, glairy, generally frothy, turbid fluid.

The quantity of saliva secreted in 24 hours varies. The average amount is probably from two to three pints in 24 hours.

The composition of saliva is:

| | |
|---|---|
| Water, | 994.10 |
| Solids, | 5.90 |

The solids are:

| | |
|---|---|
| Pyaline, | 1.41 |
| Fat, | 0.07 |
| Epithelium and Mucus, | 2.13 |
| Sulphocyanide of Potassium, | |
| Phosphate of Soda, | |

| | | |
|---|---|---|
| | ,, | |
| | ,, | |
| Lime, | | |
| | ,, | |
| | ,, | |
| Magnesia, | | |
| Chloride of Sodium, | | |
| | ,, | |
| | ,, | |
| Potassium, | | |
| | | 5.90 |

The specific gravity varies from 1.004 to 1.008.

The rate at which saliva is secreted is subject to considerable variation. When the tongue and muscles concerned in mastication are at rest, and the nerves of the mouth are subject to no unusual stimulus, the quantity secreted is not more than sufficient, with the mucus, to keep the mouth moist.

The purposes served by saliva are of several kinds:

1. Acting mechanically in conjunction with mucus, it keeps the mouth in a due condition of moisture, and facilitates the movements of the tongue in speaking, and the mastication of the food.

2. It serves also in dissolving sapid substances and rendering them capable of exciting the nerves of taste.

3. By mixing with the food during mastication, it makes it a soft pulpy mass, such as may easily be swallowed.

4. Saliva performs a chemical part in the digestion of food. It transforms starchy substances into dextrine and grape sugar.

Starch is a carbohydrate—carbon 18, hydrogen 30, oxygen 15.

$$C_{18}H_{30}O_{15} + 3H_2O = \underset{\text{(Grape sugar.)}}{C_6H_{12}O_6} + 2(C_6H_{10}O_5) + 2H_2O$$

(Dextrine.)

Ptyaline is the salient feature of saliva. It is known as a ferment—acting upon starch and converting it into dextrine and grape sugar.

The action of saliva varies in intensity in different animals.

The food after having been acted upon and prepared is propelled, by the act of deglutition, through the æsophagus into the stomach, by way of the pharynx.

The *pharynx* is that part of the alimentary canal which unites the cavities of the mouth and nose to the æsophagus. It extends from the base of the skull to the lower border of the cricoid cartilage, and forms a sac open at the lower end, and imperfect in front, where it presents apertures leading into the nose, mouth, and larynx. The pharynx is about four and a half inches in length, and is considerably wider across than it is deep from before backwards.

*The æsophagus* or gullet, the passage leading from the pharynx into the stomach, commences at the cricoid cartilage opposite the lower border of the fifth cervical vertebra, descends in front of the spine, passes through the diaphragm opposite the ninth dorsal vertebra, and ends by an opening at the cardiac orifice of the stomach. It is from nine to ten inches in length.

*The stomach* is situated in the abdominal cavity. It lies in part against the anterior wall of the abdomen, and in part

beneath the liver and diaphragm, and above the transverse colon. It is somewhat conical or pyriform in shape. The left part is the larger, and is named the cardiac, or splenic, the right is named the pyloric, extremity. The upper border is about three or four inches in length, is concave, and is named the lesser curvature, while the lower border is much longer, is convex, and forms the greater curvature. The dimensions vary greatly in different subjects, and also according to the state of distension of the organ. When moderately filled, its length is about ten to twelve inches, and its diameter at its widest part from four to five inches. It weighs when freed from other parts about four and a half ounces in the male and somewhat less in the female.

The structure of the stomach consists of four coats—a serous, a muscular, an areolar, and a mucous coat. The external or serous coat is derived from the peritoneum. There are three kinds of muscular fibers—longitudinal, circular, and oblique, and the internal mucous lining is a rather thicker, soft, smooth, pulpy membrane, lying in ridges or rugæ, and containing a large number of glands—tubular or gastric glands, and another variety of gland called peptic, besides others.

While the stomach contains no food, and is inactive, no gastric fluid is secreted; and mucus, which is either neutral or slightly alkaline, covers its surface. But immediately on the introduction of food into the stomach, the mucous membrane, previously quite pale, becomes slightly turgid and reddened with the influx of a large quantity of blood; the gastric glands commence secreting actively, and an acid fluid is poured out in minute drops, which gradually run together and flow down the walls of the stomach, or soak into the substance introduced. The quantity of this fluid secreted daily has been variously estimated; but the average for a healthy adult has been assumed to range from ten to twenty pints in twenty-four hours.

The specific gravity of gastric juice has been found to differ little from that of water, varying from 1.001 to 1.010, and the amounts of solid present to be very small, viz., about 56 per cent.

The chemical composition of gastric juice is:

| | | | |
|---|---|---|---|
| Water, | | | 994.40 |
| Solids, | | | 5.59 |
| Solids, | Ferment, pepsin, and a trace of ammonia, | 3.19 | |
| | Hydrochloric acid, | 0.20 | |
| | Chloride of calcium, | 0.06 | |
| | ,, sodium | 1.46 | |
| | ,, potassium, | 0.55 | |
| | Phosphate of lime, magnesia, and iron, | 0.12 | |

On starch gastric juice *per se* has no effect whatever, nor has healthy gastric juice any effect on grape sugar or cane sugar. On fats gastric juice is powerless.

The essential property of gastric juice is the power of dissolving proteid matters (meats, albumens, nitrogenous substances), and converting them into a substance called peptones. Gastric juice thus readily dissolves coagulated proteids which otherwise are insoluble, or soluble only with difficulty in very strong acids.

Certain conditions are required for the perfection of the process, which are all found in the stomach. The first is a

temperature of 100° F. Second, minute division and constant movement favor digestion. Third, the greater the surface presented to the action of the juice, the more rapid the solution.

Neutralization of the juice wholly arrests digestion.

The digestive action of gastric juice on proteids, like that of saliva on starch, is a ferment action; in other words, the solvent action of gastric juice is essentially due to the presence in it of a ferment body called pepsin.

The general effect of digestion of the stomach is the conversion of food into *chyme*, a substance of various compositions according to the nature of the food, yet always presenting a characteristic thick pultaceous grumous consistence.

The *small intestines* commence at the pylorus and after many convolutions terminate in the large intestines. They measure on an average about twenty feet in length in the adult. For convenience they have been divided into three parts—the *duodenum*, which extends from eight to ten inches beyond the pylorus; the *jejunum*, which occupies two-fifths, and the *ilium*, which occupies three-fifths, of the rest of the canal.

The mucous membrane, the interior coat, is the most important to the function of digestion. There are permanent folds, shelf-like processes, of the mucous membrane, called valvular conniventes. There are also villi and glands, as the glands of Lieberkühn, of Peyer, and of Bruner. The glands of *Lieberkühn* are thickly distributed over the whole surface of the large and small intestines. The glands of *Peyer* are exclusively in the small intestine. They are found in greatest abundance in the lower part of the ileum near to the ileo-cæcal valve. They are met with in two conditions,

viz., either scattered singly, in which case they are termed *glandulæ solitairæ*, or aggregated in groups varying from one to three inches in length and about half an inch in width, chiefly of an oval form, their long axes parallel with that of the intestines. In this state they are named *glandulæ agminatæ*. The latter are almost always placed opposite the attachment of the mesentery. In structure they are analogous to lymphatics or absorbent glands, and their office is to take up certain materials from the chyle, elaborate them, and subsequently discharge them into the *lacteals*, with which vessels they appear to be closely connected. *Bruner's* glands are confined to the duodenum; they are most abundant and thickly set at the commencement of this portion of the intestines, and are provided with permanent gland ducts.

The *villi* are confined exclusively to the mucous membrane of the small intestines. They are minute vascular processes, from a quarter of a line to a line and two-thirds in length. There are about fifty to ninety in number to a square line. Each villus consists of a small projection of mucous membrane, and its interior is supported throughout by fine retiform or adenoid tissue. Two or more arteries are distributed to each villus, and from their capillaries, which form a dense network, proceed one or two small veins, which pass out at the base of the villus.

The *lacteal vessels* enter the base of each villus, and passing up in the middle extend nearly to the top, where it ends commonly by a closed and somewhat dilated extremity. The office of the villi is the absorption of chyle from the completely digested food of the intestines.

The *large intestine* extends from the termination of the ileum to the anus. It is usually about five to six feet in length, being about one-fifth of the whole length of the intestinal canal. The large intestine is constructed of four

coats like those of the stomach and small intestines, namely, the serous, the muscular, the areolar or submucous, and the mucous. It is divided into the ascending colon, transverse and descending colon, and rectum and anus.

The *cæcum* is a short wide pouch, communicating with the lower end of the small intestines through an opening guarded by the ileo-cæcal valve. The appendix vermiformis is attached to the cæcum. The colon commences at the right groin, ascends to the liver, forms the hepatic flexure, then crosses transversely from right to left to the spleen, forms the splenic flexure, descends to the left groin, forms the sigmoid flexure, passes through the pelvis as the rectum, and terminates at the anus.

The mucous membrane of the large intestines, like that of the small intestines, is lined throughout by columnar epithelium, but unlike it, is quite destitute of villi and is not projected in the form of valvular conniventes.

The *peritoneum*, or serous membrane of the abdominal cavity, is by far the most extensive and complicated of serous membranes. Like the others, it may be considered to form a shut sac, on the outside of which are placed the viscera, which it covers. The peritoneum forms the mesenteries and omenta for the stomach, small and large intestines, and ligaments for the liver, spleen, uterus, and bladder.

The *liver* is a very important glandular organ, very constant in the animal series, being found in all the vertebrates, and, in a more or less developed condition, in most invertebrate tribes. It secretes bile, and appears to act upon the blood which is transmitted through it. The liver is the largest gland in the body, and by far the most bulky of the abdominal viscera. It measures from ten to twelve

inches transversely from right to left, between six and seven inches from its posterior to its anterior border, and about three and a half inches from above downwards where thickest, which is towards the right and posterior part. The average bulk is about eighty-eight cubic inches. The ordinary weight in the adult is between 50 to 60 ounces, about one-thirtieth of the weight of the whole body. The liver is solid to the feel, and of a dull reddish-brown color, with frequently a dark-purplish tinge along the margin. It has an upper surface smooth and convex, and an under surface which is uneven and concave. The liver is divided into two unequal lobes, a right and a left, and on the under surface of the right lobe are three secondary lobes or lobules, named the lobe of Spigolius, the caudate or tailed lobe, and the square lobe. It has five fissures or fossæ, described as the transverse or portal; the umbilical fissure and the fissure of the ductus venosus, together forming the longitudinal fissure; the fossa of the vena cava, and the fossa of the gall bladder. It is held in position by five ligaments formed by layers of peritoneum.

The liver is situated on the right side of the body under the diaphragm. The convex surface is protected, on the right by the six or seven lower ribs, and in front by the cartilages of the same, and by the ensiform cartilage, the diaphragm of course being interposed.

To the left of the longitudinal fissure the liver is in contact with the pyloric extremity and anterior surface of the stomach, on which it moves freely. When the stomach is quite empty, the left part of this surface of the liver may overlap the cardiac end of that organ. To the right of the longitudinal fissure the liver rests upon the first part of the duodenum and the hepatic flexure of the colon. Farther back it is in contact with the upper part of the right kidney and suprarenal capsule.

The two blood-vessels which supply the liver are the hepatic artery and the vena porta. The hepatic vein conveys the blood away from the liver.

The *lymphatics* of the liver are large and numerous, forming a deep and a superficial set.

The nerves are derived partly from the cœliac plexus and partly from the pneumogastric nerve, especially from the left pneumogastric.

The *excretory apparatus* of the liver consists of the hepatic duct, the cystic duct, gall bladder, and common bile duct.

The *hepatic duct* is formed by the union of a right and left branch, which issue from the bottom of the transverse fissure and unite at a very obtuse angle; it descends to the right, within the gastro-hepatic omentum. Its diameter is nearly two lines, and its length nearly two inches. At its lower end it meets the cystic descending from the gall bladder, and the ducts uniting together at an angle form the *common bile duct*.

The *cystic duct* is about one and a half inches in length.

The *gall bladder* is a pear-shaped membranous sac, three or four inches long, about an inch and a half across its widest part, and capable of containing from 8 to 12 fluid drachms. The gall bladder is attached to the liver. The neck, gradually narrowing, becoming constricted, bends downward, and terminates in the cystic duct.

The *common bile duct* (ductus communis choledicus), the largest of the ducts, being from two to three lines in width, and nearly three inches long, conveys the bile from the liver and the gall bladder into the duodenum by a common orifice, with the pancreatic duct on its inner surface, about

three to four inches below the pylorus.

The liver is an extremely vascular organ, and receives its blood supply from two distinct vessels, the *portal vein* and the *hepatic artery*, while the blood is returned from it into the inferior vena cava by the *hepatic vein*. Its secretion, the bile, is conveyed from it by the hepatic duct, either directly into the intestines, or, when digestion is not going on, into the cystic duct, and thence into the gall bladder, where it accumulates until required. The portal vein, hepatic artery, and hepatic duct branch together throughout the liver, while the hepatic vein and its tributaries run by themselves. At the transverse fissure it is merged into the areolar investment called Glisson's capsule, which surrounds the portal vein, hepatic artery, and hepatic duct, as they enter at this part, and accompanies them in their branches through the substance of the liver.

The liver is made up of small roundish or oval portions called lobules, each of which is about 1⁄20 of an inch in diameter, and composed of minute branches of the *portal vein*, *hepatic artery*, *hepatic duct*, *and hepatic vein*; while the interstices of these vessels are filled by liver cells. These cells, which make up a great portion of the substance of the organ, are of rounded or polygonal form; about 1⁄800 to 1⁄1000 of an inch in diameter.

The function of the liver is the secretion of bile. The bile is a somewhat viscid fluid of a yellow, or greenish-yellow, color, a strongly bitter taste, and when fresh a scarcely perceptible odor. It has a neutral or slightly alkaline reaction, and its specific gravity is 1.020.

The composition of human bile is:

Water, 859.2

| | |
|---|---|
| Solids, | 140.8 |
| | 1,000 |

The solids are:

| | |
|---|---|
| Biliary acids combined with alkalies (bilin), | 91.5 |
| Fat, | 9.2 |
| Cholestrin, | 2.6 |
| Mucus and coloring matter, | 29.8 |
| Salts, | 7.7 |
| | 140.8 |

Bile is distinguished from the other alimentary secretions by the entire absence of proteids. The chemical composition of bilin, as compared with the organic parts of blood, is:

| | | Carb. | Hyd. | Nitr. | Oxy. | Sul. |
|---|---|---|---|---|---|---|
| Bilin atoms, | | 76 | 66 | 2 | 22 | |
| Blood, | | 48 | 36 | 6 | 14 | |
| Coloring matter, | Biliverdin, | 16 | 20 | 2 | 5 | |
| | Glycocholic acid, | 26 | 43 | 1 | 6 | |
| | Taurocholic acid, | 26 | 45 | 1 | 7 | 1 |

There seems to be some relationship between the coloring matters of the blood and bile; and it may be added, between these and that of the urine also; so that it is possible they may be, all of them, varieties of the same pigment, or derived from the same source.

The *quantity of bile* discharged into the intestines is estimated to be about thirty to forty ounces secreted by an adult man in twenty-four hours.

The *purposes served* by the secretion of bile may be considered to be of two principal kinds, viz., excrementitious and digestive.

As an *excrementitious* substance, the bile serves especially as a medium for the separation of excess of *carbon* and *hydrogen* from the blood.

Though one of the chief purposes of the secretion of bile may appear to be the purification of the blood by ultimate excretion, yet there are many reasons for believing that while it is in the intestines it performs an important part in the process of *digestion*. Bile has a slight solvent action on fats, and only a slight emulsifying power.

Its functions generally may be considered thus:

1. It assists in emulsifying fatty portions of food, thus rendering them capable of being absorbed by the lacteals.

2. Bile facilitates the absorption of fatty matter.

3. Bile, like the gastric fluid, has a strongly antiseptic power, and may serve to prevent the decomposition of food during the time of its sojourn in the intestines.

4. Bile has been considered to act as a natural purgative, by prompting an increased secretion of the intestinal glands.

5. Another very important function appears to be that of so acting upon certain constituents of the blood passing through it, as to render some of them capable of assimilation with blood generally, and to prepare others for being duly eliminated in the process of respiration.

6. An important influence seems also to be exerted by the liver upon the saccharine matters derived from the alimentary canal. The chief purpose of the saccharine and amylaceous principles of food is, in relation to respiration and the production of animal heat.

*The pancreas* is a long, narrow, flattened gland of a reddish-cream color, larger at one end than at the other, and lying behind the stomach opposite the first lumbar vertebra. It is usually from 6 to 8 inches long, about 1½ inch in average width, and ½ to 1 inch in thickness. It weighs about 2¼ to 3½ ounces. Its principal excretory duct is called the pancreatic duct, and runs through the entire length of the gland from left to right. The duct opens in a common orifice with the ductus communis choledicus on the inner surface of the duodenum about 4 inches below the pylorus.

Healthy pancreatic juice is a clear, viscid fluid, frothing when shaken. It has a very decided alkaline reaction. The pancreas in its minute anatomy closely resembles the salivary glands; and the fluid elaborated by it appears almost identical with saliva.

The composition of pancreatic juice is:

| | |
|---|---|
| Water, | 980.45 |
| Solids, | 19.55 |

The solids are:

| | |
|---|---|
| Pancreatic, | 12.71 |
| Inorganic bases and salts, | 6.84 |
| | 19.55 |

*Action of pancreatic juice.* (1) It acts on starch raw and boiled with great energy, rapidly converting it into grape sugar. (2) On proteids (meats) it also exercises a solvent action, so far similar to that of gastric juice that by it the proteids are converted into peptones. (3) On fats pancreatic juice has a twofold action: it emulsifies them, and it splits up neutral fats into their respective acids and glycerine.

Thus pancreatic juice is remarkable for the power it possesses of acting on all food-stuffs—on starch, fats, and proteids.

*Succus entericus* (intestinal juice). The precise action of this is not known. It has been said to act upon starch, to convert proteids into peptones, and to emulsify fats. On the other hand, each of these actions has been denied.

The *portal system of veins*. The portal vein, or vena porta, collects the blood from the stomach, intestines, pancreas, and spleen; and carries it to the liver, from which the bile is secreted; ramifying after the manner of an artery in the substance of the liver and conveying to the capillaries of that organ the blood collected in the main trunk. This blood, together with that of the hepatic artery, after having served for the secretion of the bile and the nourishment of the liver, is withdrawn from that organ by the hepatic veins, and carried by them into the vena cava inferior.

*Digestion* begins at the mouth. Food is masticated by the movement of the lower jaw, broken into small pieces, moistened by the saliva, and starchy substances are converted into sugar. No change takes place during the rapid transit through the æsophagus.

In *the stomach* the proteids are acted upon by the gastric juice and converted into peptones. Fats remain unchanged, and sugars are not acted upon. While these changes are

proceeding, the thick grayish liquid, or chyme, formed by the imperfectly dissolved food, is from time to time ejected through the pylorus, accompanied even by large morsels of solid less digested matter. This may occur within a few minutes of food having been token, but the larger escape from the stomach probably does not begin till from one to two and lasts from four to five hours after the meal, becoming more rapid towards the end, such pieces as most resist the gastric juice being the last to leave the stomach. Substances can be absorbed from the cavity of the stomach into the circulation. The presumption is, that the diffusible sugars and peptones pass by osmosis direct into the capillaries, and so into the gastric veins.

In *the small intestines* the semi-digested food, or chyme, as it passes the biliary orifice causes a gush of bile, and at the same time the pancreatic juice which flows freely into the intestine at the taking of the meal, is secreted again with renewed vigor, when the gastric digestion is completed. The conversion of starch into sugar, which may have languished in the stomach, is resumed with great activity by the pancreatic juice. The pancreatic juice emulsifies fats, and also splits them into their respective fatty acids and glycerine, and the bile is able to a certain extent to saponify the free fatty acids. It also appears that the slight emulsifying power of the bile is much increased by the presence of soap; and as a matter of fact, the bile and pancreatic juice do largely emulsify the contents of the small intestines, so that the grayish turbid chyme is changed into a creamy-looking fluid, which has been called chyle. These products as they are formed pass into the lacteals or the portal blood-vessels.

Through *the large intestine* pass off indigestible or undigested constituents of the meal, and the gases generated.

*Absorption* takes place from the stomach, and occurs along the course of the small and large intestines, especially of water. The largest and most important part of the digested material passes away from the canal during the transit of food along the small intestines, partly into the *lacteals*, partly into the *portal vein*.

Digestion being, broadly speaking, the conversion of non-diffusible proteids and starch into highly diffusible peptones and sugar, and the emulsifying, or division into minute particles, of various fats, it is natural to suppose that the diffusible peptones and sugars pass by osmosis into the blood-vessels, and that the emulsified fats pass into the lacteals. That the great mass of the fat which enters the body from the intestines passes through the lacteals, there can be no doubt; and there is but little doubt that a considerable quantity of peptone and sugar does pass into the portal blood.

*Chyle* is a white milky-looking fluid, which after its escape coagulates, forming a not very firm clot. The nature of the coagulation seems to be exactly the same as that of blood.

*Lymph* seems to be blood *minus* red corpuscles, and chyle is lymph *plus* a very large quantity of minutely divided fats.

It has been calculated that a quantity equal to that of the whole blood may pass through the thoracic duct in twenty-four hours, and of this it is supposed that about half comes from food through the lacteals, the remainder from the body at large; but these calculations are based on uncertain data.

*Entrance of chyle* into the lacteals. The lacteals begin at a club-shaped lymphatic space lying in the center of the villus, and connected with the smaller lymphatic spaces of

the adenoid tissue around it; it opens below into the submucous lymphatic plexus from which the lacteals spring.

The thoracic duct is the common trunk which receives the absorbents from both the lower limbs, from the abdominal viscera, from the walls of the abdomen, from the left side of the thorax, left lung, left side of the heart, and left upper limbs, and from the left side of the head and neck. It is from fifteen to eighteen inches long in the adult, and extends from the second lumbar vertebra to the root of the neck. At the last dorsal vertebra there is usually a dilation of the duct, of variable size, which is called the receptaculum chyli, and is the common place of junction of the lymphatics of the lower limbs and the trunks of the lacteal vessels. There are two sets of absorbent vessels—the lacteals, which convey the chyle from the alimentary canal to the thoracic duct; and the lymphatics, which take up the lymph from all the other parts of the body and return it into the venous system. There is a *right lymphatic duct*, about a quarter to a half inch in length, which receives the lymph from the absorbents of the right upper limb, the right side of the head and neck, the right side of the chest, the right lung and the right half of the heart, and the upper surface of the liver. The thoracic duct terminates on the outer side of the internal jugular vein, in the angle formed by the union of that vein with the subclavian, and the subclavian empties itself in the superior vena cava.

Lymphatics and lacteals are furnished with *valves* serving the same office as those of the veins, and for the most part constructed after the same fashion.

*Lymph* and *chyle*, unlike the blood, pass only in one direction, namely, from the fine branches to the trunk and so to the large veins, on entering which they are mingled with the stream of blood and form part of its constituents.

In some part of their course all lymphatic vessels pass through certain bodies called lymphatic glands.

Analysis of lymph and chyle:

| | **Lymph.** | **Lymph from Thoracic Duct.** | **Chyle from the Lacteals.** |
|---|---|---|---|
| Water, | 937 .32 | 939 .70 | 902 .37 |
| Fibrine, | 0 .595 | 10 .60 | 3 .70 |
| Albumen, | 42 .775 | 38 .83 | 35 .16 |
| Fat, | 6 .51 | a little | 36 .01 |
| Extractive Matter, | 5 .05 | | |
| Salts, | 7 .75 | 10 .87 | 22 .76 |
| | 1000. | 1000. | 1000. |

Chyle having reached the lymphatic channels, its onward progress is determined by a variety of circumstances. Putting aside the pumping action of the villi, the same events which cause the movement of the lymph generally, also further the flow of the chyle, and these are briefly as follows:

1. The wide-spread presence of valves in the lymphatic vessels causes every pressure exercised on the tissues in which they lie, to assist in the propulsion forward of the lymph.

2. Considering the whole lymphatic system as a set of branching tubes passing from the extravascular regions just outside the small arteries and veins and capillaries, to the large venous trunks, it is obvious that the mean *pressure* of

the blood in the subclavian at the junction with the jugular is the cause of the movement, etc., assisted perhaps by the respiratory movements, and other causes, as osmosis, etc.

The average quantity of *solid fecal matter* evacuated by the human adult in twenty-four hours is about five ounces; an uncertain proportion of which consists simply of the undigested or chemically modified residue of the food, and the remainder of certain matters which are excreted in the intestinal canal.

*Gases contained* in the stomach and intestines. The sources of the gases contained in the stomach and bowels may be enumerated:

1. Air introduced in the act of swallowing either food or saliva.

2. Gas developed by the decomposition of alimentary matter, or of the secretions and excretions mingled with it in the stomach and intestines.

3. It is probable that a certain mutual interchange occurs between the gases contained in the alimentary canal, and those present in the blood of the gastric and intestinal blood-vessels.

*The movement of the intestines* is peristaltic or vermicular, and is effected by the alternate contractions and dilatations of successive portions of the intestinal coats. The contractions, which may commence at any point of the intestine, extend in a wavelike manner along the tube. This is due to the involuntary longitudinal and circular muscular fibers contracting successively from above downwards and from behind forwards, etc. The movements take place slowly, and in health are commonly unperceived by the mind, but they are perceptible when they are accelerated

under the influence of any irritation.

## CHAPTER XXI.

# THE ELEMENTARY SUBSTANCES.

We have thus far discovered that this terrestrial globe is composed of sixty-four elementary substances; that fifty belong to a class called metals, and the remaining fourteen are non-metallic and are called metalloids.

We know with absolute certainty the elementary chemical composition of all the substances known to man; everything within the reach of man has been analyzed, whether of inorganic or of organic origin.

We also know the principal elements that enter into the composition of organic substances, animal or vegetable.

But a thing that is not generally known is the wonderful role certain elements play in nature, especially in the life of plants and animals.

If we examine the extraordinary display of combination or composition of some of the elements—especially those that enter into the composition of organic substances—we shall find how few of these elements are essential for the production of life, and its maintenance; and we shall be surprised to find what force or power, and phenomena,

they are capable of producing. We shall be surprised to see how nicely and delicately these elementary compositions are adjusted—with what precision the elements enter into combination with each other—and with what astonishing result.

The union of the elements that enter into the composition of living matter, must always be very accurately balanced, to insure a healthy or normal condition of either plant or animal. A very slight deviation or change may prove either injurious or destructive to the living organism.

In order to obviate writing the names of the elements, we propose to use symbols. The elementary substances that enter into the composition of living matter being few, it will not be difficult to recognize the meaning of the symbols. The four vital elements mentioned in a previous chapter are

| | *Carbon.* | *Hydrogen.* | *Nitrogen.* | *Oxygen.* |
|---|---|---|---|---|
| Symbols: | C | H | N | O |

The atmosphere we breathe, for example, is what is called a chemical mixture, and is composed of $O_{22}N_{77}$, with traces of ammonia, etc.

The water we drink is a chemical composition, and is constituted by O $H_2$.

The number placed against each element indicates the quantity of each one requisite, or found, in the composition, or chemical combination, of the substance indicated.

Take water for example. $O_1$ (one) and $H_2$ (two), that represents a chemical compound. It is most abundant, and

is by far the most essential, in the formation of organic life.

*Air*, *water*, *fire*, are represented by the four elements C H N O.

Every power, every force known to man is dependent upon these. Every kind of life is made up of these. Of every phenomenon manifested by nature, whatever the display may be or where it may occur, these elements are the fundamental basis.

Protoplasm, which is acknowledged to be the base of physical life, is nothing more than a homogeneous mass of albuminous matter which is composed of C H N O—with a greater or less quantity of each of these elements.

These elements enter into the formation of all *gases*, *fluids*, and *solids*. They are *invisible* at one time and *visible* at another. Without taste or color or odor in a free state, or even in combination, they assume taste, color, and odor when the elements combine in certain proportions. They become either harmless or poisonous; create, maintain, or destroy life.

*Oxygen* is a tasteless, colorless, and inodorous gas.

*Hydrogen* is a colorless, tasteless, and inodorous gas.

*Nitrogen* is destitute of color, taste, or odor.

*Carbon* is a solid but becomes gaseous in combination with either Oxygen or Hydrogen.

The diamond is one of the most remarkable substances known. It is always distinctly crystallized, often quite transparent and colorless, now and then having a shade of yellow, pink, or blue. Carbon is also found as graphite or plumbago. It constitutes a large proportion of all organic

structures, animal and vegetable. Pure carbon, diamond, is the hardest substance known. In combination with Oxygen and Hydrogen it forms the softest of living matter, protoplasm. In combination with Oxygen it is poisonous to all animal life, and beneficial to vegetable life. Combined with Hydrogen, it forms the gas we burn, and is destructive to animal life. It is the food-maker in the plant, and it is the food-provider for the animal. It is the combustive agent in nature, in vegetables and in animals. From a thunderstorm to a flickering flame of a candle, carbon displays its power. From the smallest and lowliest aquatic vegetable cell to the highest animal cell tissue, it is the important solidifying, heat-giving element. These elements when free have neither color, odor, nor taste. Combined, however, they acquire odor, taste, and color.

O and N, the atmosphere, has no color, taste, or odor.

O and H, water, has no color, taste, or odor.

N and H, ammonia, has color, taste, and odor.

O and C is given off by animals, taken in by vegetables—carbonic acid.

C and H, the gas, has taste, odor, and color.

N and O produce a gas—laughing gas.

Any two of these elements may combine in the form of a gas, a liquid, or a solid. And any one may combine with any other element known and form a substance, a molecule.

O combines with all the elements known.

H

,,
,,

many.

N
,,
,,
some.

C
,,
,,
many.

Two elements form a substance.

Three elements form vegetable life.

Four elements form animal life.

Common salt is used daily with our food; is harmless and useful; it is known as the chloride of sodium. By analysis this compound is separated, analyzed, into chlorine and sodium. *Na* stands for sodium, and *Cl* for chlorine. Combine Cl with H. That forms hydrochloric acid, a strong poison, strong enough to dissolve marble. Cl has little attraction for O. Its chemical energies are principally exerted toward hydrogen and the metals. Cl is one of the best disinfectants, and makes excellent bleaching material. Na (sodium) combines with O, and H, and C. These are some of the combinations:

Na Cl = common salt.

Cl H = hydrochloric acid, a poison.

O Na H = caustic soda.

$Na_2$ N $O_3$ = Chili saltpetre.

$Na_2$ C $O_3$ = sodium, carbonate, etc.

Phosphorus and sulphur and other elements enter into combination with Oxygen and Hydrogen.

Both phosphorus (P) and sulphur (S) enter into organic life, but play a subordinate role.

The vegetable cell contains liquid, solid, and air. The growing, vitally active cells are filled with liquid, namely O and H, charged with more or less nutritive assimilated matters, C, etc.

Sap—the liquid which is imbibed by the roots and carried upwards by the stem—this is the water impregnated with certain gaseous matter derived from the air, and minute portions of earthy matter dissolved from the soil under the influence of light. Sap *elaborated*—from this we obtain the ternary substances composed of three elements, O C H; also substances composed of four elements, O C H N. The latter represents protoplasm or protein.

Vegetable chemical compounds, organic substances, can be produced only under certain vitalizing conditions and influences.

Wherever upon the surface of this earth, the sun's rays produce a certain degree of heat, temperature, C H O may combine and evolve vegetable life.

In tropical climates, for example, notwithstanding the sun's heat, no vegetation grows on high mountain peaks that are covered with snow and ice year in and year out; nor will vegetation grow in the cold climate of the north. C H and O will produce vegetable life only in the presence of heat. Heat is essential. And there is one source only whence it can be obtained, that is the sun.

The climate, as the temperature, etc.; the quantity of

elements, and the quality of soil, vary the products of vegetation. That accounts for the immense variety, the differences existing. The organic chemical combinations in vegetable life are infinite. And all these varieties depend on the numerical quantities of each of the elements C H O that enter any composition.

*The products of vegetation.*

| | C | H | O | N |
|---|---|---|---|---|
| Starch food substances, | 18 | 13 | 15 | |
| Sugar, grape, | 6 | 12 | 6 | |
| ,, cane, $H_2O$ + | 12 | 22 | 11 | |
| Oils, aniseed, etc., | 10 | 12 | 1 | |
| Acids, tartaric, | 4 | 6 | 6 | |
| ,, , citric, etc., | 6 | 8 | 7 | |
| Hydrocyanic, or prussic, acid, one of the strongest poisons, | 1 | 1 | | 1 |
| Tannin or tannic acid, | 27 | 22 | 17 | |
| Turpentine oil (composed of carbon and hydrogen only) | 10 | 16 | | |

We have other vegetable products called *alkaloids*, that are

principally found in the bark and the leaves. A few examples will suffice:

| | C | H | N | O |
|---|---|---|---|---|
| Morphia, | 17 | 19 | 1 | 3 |
| Strychnine, | 21 | 22 | 2 | 2 |
| Quinine (sulphate $H_2SO_4$), | 20 | 24 | 2 | 2 |
| The essence of coffee and tea, caffein or thein, | 8 | 10 | 4 | 2 |

The alcohols, acids, ethers, and so on, are all composed of these elements:

| | C | H | O |
|---|---|---|---|
| Alcohol, | 2 | 6 | 1 |
| Acetic acid, | 2 | 4 | 2 |

The combinations are infinite. Volumes are filled with organic chemistry. Mere mention only can be made, to show the wonderful power these elements display when variously combined.

The products of destructive distillation of coal yield a remarkable series of combinations:

| | Carb. | Hyd. |
|---|---|---|
| Light carburetted hydrogen, marsh gas, or fire-damp, is composed of | 1 | 4 ($C_1H_4$) |
| Aceteline, another product, | 2 | 2 ($C_2H_2$) |

| | | |
|---|---|---|
| Heavy carburetted hydrogen, olefiant gas, the gas we burn, ethelene, | 2 | 4 ($C_2H_4$) |

These may undergo a vast variety of changes and combinations. Chloroform, alcohol, ethers, acids, oils and fats, resins, balsams, etc., etc., all have these elements in combination.

Does it not seem strange that the different numerical combinations of the same elements should have such different effects upon the animal system?

Why should starch and sugar compounds be good for the sustenance of animal life while other compounds of the same elements prove destructive to life? Or, why should morphia have such a peculiar effect upon the animal tissues—especially the nervous? And why should alcohol have such a peculiar effect upon the master tissues of the body? The difference in the chemical composition of quinine and strychnine is not so very great, yet the action upon the system is by no means the same. The effect upon the tissues is not the same.

Those who believe in a God easily dispose of these questions by simply exclaiming, They are the wonderful works of God!

That one drop of hydrocyanic acid upon the tongue of an animal should kill is very astonishing; that acid being composed only of one of Carbon, one of Hydrogen, and one of Nitrogen (C N H). Why should it paralyze the brain first, before it affects the heart, since it has to be carried by the blood through the circulation to the brain? The derangement of the functions of that center causes death.

The revelations of these important combinations and actions man had to make for himself. They were not

brought down to us on tablets of stone by some supernatural agent, nor did spirits or angels communicate the mysteries and the powers of these elements.

It is owing to the development of man's intellectual faculties, that the combinations of these elements has been made possible. It was quite a discovery when it was found that nitre, sulphur, and charcoal made gunpowder. There are only five elements in that compound, viz., Nitrogen, potassium, Oxygen, Carbon, and sulphur. Chili saltpeter is used for domestic purposes. Harmless to animal life, so is each one of these elements when they enter into combinations that are not destructive to life.

The forces and powers exercised by any compound depend on the number and kind of elements that enter into the composition. And the influence that bears directly upon their mutual activity again depends, when in a state of nature, upon the presence of heat. When a seed, as of wheat or of any starchy vegetable, is thrown into the ground, it will not germinate except in the presence of a certain amount of moisture, and heat, the heat varying from 50° to 80° Fahrenheit, in addition to free communication with the air.

Temperature, moisture, air, electricity, kind and quantity of the various elements in the soil present, cause the immense variations in plant life and plant compositions. Yet the same elementary compositions will be found in the same species, and the same conditions generally will be required to reproduce them.

Each group of elements that enters into the composition of any substance, carries with it qualities and capabilities peculiar to itself, throughout the vegetable kingdom. Its influence upon the animal economy will depend on the various atomic elements, and the quantities of each, that

enter its combinations. For example, the atmosphere, the balance of power between O and N, is essential to both plant and animal. So with water, O $H_2$. And so with those foods, starch and sugars, $C_{18}H_{30}O_{15}$ or $C_6$ $H_{12}O_6$; in each of these substances Carbon has its complement of Hydrogen and Oxygen. That is, the Carbon is, as it were, diluted in a sufficient quantity of water to make it suitable for food. Rob it of its Oxygen and it becomes a poison, an active poison. The less the quantity of Oxygen in any substance of organic origin the more unfit it becomes as a food. And it becomes poisonous to the animal system in proportion as the Oxygen is absent or removed from the composition. We have representatives of poisonous substances in alcohol, $C_2H_6O$, a mild poison; and in hydrocyanic acid, C N H, the strongest poison known.

Moreover, we see already peculiar manifestations in vegetable life, humble in character, low in degree. Plants not only rest from activity, but have their sleep and exhibit sensible movement from irritation. The foliage of the locust, and of most leguminous plants, and that of oxalis and wood-sorrel, seem to have their sleep, as seen by the position of their leaves and blossoms. Irritate the mimosa plant, as by roughly touching it, and the leaflets will suddenly change position. In the Dionæa muscipula, or Venus's flytrap, the touch of an insect, alighting upon the upper surface of the outspread laminæ, causes its sides to close suddenly, the strong bristles of the marginal fringe crossing each other like the teeth of a steel trap, and the two surfaces pressing together with considerable force, so as to retain, if not destroy, the intruder, whose struggles only increase the pressure which this animated trap exerts.

It is evident that the elementary combinations under certain conditions and the influence of heat, will exhibit vital action, in an organic form—manifest phenomena of life, that are only in degree, and not in kind, inferior to the

lowest plant life. The process is the same. The mode of living differs in degree, though the results are different.

The combination and exchange of elements takes place in the simple plant life as in the higher animal life. The watery portion of plant life is composed of O and $H_2$, the same as water in a free state or water in animal life, and the combination of Oxygen and Hydrogen with Carbon. The food substances are found in the vital machinery of vegetation.

The characteristics of life exhibited in the lower grade of vegetation, are seen in a more perfect degree in animal life —respiration, exchange of gases, imbibition, absorption, assimilation, evolution of heat and motion, the power of incorporating material in its own substance, endosmosis, subjectibility to irritation, exhaustion, spontaneous movement, rest and sleep, capability of being influenced by various stimuli, etc., etc.

The combination of O, C, and H, organized and vitalized, in conjunction with a few other less important elements, manifests in conformity with the laws of nature all functions and activities that plant lie is capable of realizing. It would neither be extravagant, nor an exaggeration, considering the important role these elements play in vegetation, if they were rightfully termed the soul-life of plants.

## CHAPTER XXII.

# ALCOHOL AND ITS EFFECTS ON THE SYSTEM.

All substances taken into the stomach as food are of three kinds, carbohydrates, proteids, and fats. This means, starch, sugars, meats, and fats, besides water and some salts.

Food substances carry their own complement of water, serve nutritive purposes when taken into the system, and are easily dissolved by the various fluids in the body.

Food may be taken into the system for three purposes: 1. Simply for the maintenance of health; 2. For fattening purposes; 3. For the sake of muscular energy.

The body, the human body, consists, speaking in general terms, of carbohydrates, fats, and proteids, and water and saline matters.

We have seen that the work done by the master tissues causes a loss, or produces a certain amount of waste material, consisting of Carbon, Hydrogen, Oxygen, and Nitrogen, and some mineral matter—salts. This loss or

waste has to be replaced in quantity and quality sufficient in order to maintain a healthy condition of the body.

And, since we know the precise, or almost the precise, quantity of material excreted, which consists of Carbon, Nitrogen, Oxygen, and Hydrogen, etc., we can also estimate, with considerable precision, the quantity needed to replace it.

More than 41 per cent of the entire weight of the body is made up of muscular tissue. The nervous tissue constitutes not quite two per cent.

The chemical composition of muscular and nervous tissue —of the solid part only—is

| **Carbon.** | **Hydrogen.** | **Nitrogen.** | **Oxygen.** | **Sul.** |
|---|---|---|---|---|
| 51 .5 | 6 .9 | 15 .2 | 20 .9 | 0 .3 |
| to | to | to | to | to |
| 54 .5 | 7 .3 | 17 .0 | 23 .5 | 2 .0 |

The watery portion of the muscle is not mentioned. Please notice the large quantity of *Carbon* and the small quantity of *Hydrogen* in the composition of the solid part of the muscle.

We are aware that the muscles are always producing *Carbonic Acid*—that is, C and $O_2$—and when a muscle contracts, there is a sudden and extensive increase of the normal production.

The blood that comes from a contracting muscle is richer in Carbonic acid—that is, it contains one atom more of *Carbon* and *two atoms of Oxygen* more.

The blood that has passed through the lungs changes from venous to arterial blood. The venous discharges about 5 vols. of Carbonic acid (C $O_2$); the arterial carries away about 5 vols. of Oxygen (O) to the tissues.

The carbohydrates taken into the system:

| | | *Oz.* |
|---|---|---|
| Starch and sugars, | about | 20 |
| Meats, proteids, | ,, | 15 |
| Fats, | ,, | 3 ½ |
| Water, | ,, | 52 |

About 32 ounces of saliva converts the starch into sugar. That is, the saliva changes starch ($C_{18}$ $H_{30}$ $O_{15}$) into sugar ($C_6$ $H_{11}$ $O_5$). Meats are acted upon by the gastric juice, it requiring about ten to twenty pints to dissolve three-quarters to one pound of meat-stuff; and the substances in the stomach are changed into chyme. The fats are emulsified by the gall from the liver—about 30 to 40 ounces for 3 to 4 ounces of fat. And the pancreatic juice completes the work and still farther dissolves all three kinds of substances, so that, with the aid of the succus entericus, the whole mass is changed into a substance called chyle. All the carbohydrates and proteids in solution, together with the fluids taken into the system, are taken up by the veins of the abdominal organs and conveyed by the portal vein to the liver. Passing through the liver, the blood is collected by the hepatic vein and emptied into the inferior vena cava. The fatty substances are taken up by the lacteals to the receptaculum chyli, passed up the thoracic duct, and poured into the left

subclavian vein, which empties its contents into the superior vena cava.

Both streams of blood—venous blood—from the superior and inferior vena cava, pass into the right auricle, thence to the right ventricle, through the pulmonary artery into the lungs, there exchange the Carbonic acid for Oxygen, and return by means of the pulmonary veins into the left auricle, thence to the left ventricle, through the aorta into the general system—and to the master tissues.

In the tissues the Oxygen is taken up. That is, the Oxygen passes from the blood to the tissues and the tissues throw off the Carbonic acid, which the veins again carry to the right side of the heart.

Alcohol is composed of Carbon two (2), Hydrogen six (6), and Oxygen one (1) ($C_2$ $H_6$ $O_1$). Alcohol, like all poisonous substances, carries a small amount of Oxygen. In composition it resembles very much, and probably is, a union of $C_2$ $H_4$ + $H_2$ O, $C_2$ $H_4$ = ethane, olefiant gas, or heavy carburetted hydrogen. It is, in fact, a constituent of the gas we burn, procured from the destructive distillation of coal—in other words, coal gas. To make it plainer, ethane contains two of Carbon, four of Hydrogen + one molecule of water.

When alcohol is taken into the system, it is almost immediately absorbed by the veins of the stomach, is carried at once by the portal vein to the liver, and returns from the liver by way of the hepatic vein to the inferior vena cava, to the right auricle, and to the lungs through the right ventricle.

But the lungs cannot supply Oxygen enough to satisfy the Carbon of the alcohol. There is only one atom of Oxygen in the composition of alcohol, and three more atoms of

Oxygen are needed to form Carbonic acid ($C O_2$). Under ordinary, normal conditions, Oxygen enough is inspired to satisfy the wants of the tissues for combustion purposes, but in the case of alcohol an extra demand for Oxygen is made, and the lungs are not prepared to supply the demand.

Since oxidation takes place in the tissues and not in the blood, the blood, being overcharged with heavy carburetted Hydrogen ($C_2 H_4$), unloads it into the tissue. The extra amount of Carbon arriving at the tissue, robs it of its Oxygen. The Oxygen arriving from the lungs being insufficient, the tissue loses Oxygen. The presence of Oxygen is necessary for the maintenance of irritability. From the fact that no free Oxygen is present in the muscular tissue the tension is *nil* or even less than nothing.

When the Carbon of the alcohol robs the tissues of its Oxygen, the Hydrogen is set free. What becomes of it? The muscular and nervous tissues contain from 51 to 54 per cent of Carbon in their composition, and 6 to 7 per cent of Hydrogen. The free Hydrogen combines with the Carbon of the tissues and forms carburetted Hydrogen, with which the blood gets overloaded, and carries it to the other tissues. The nervous system, the brain, not receiving the Oxygen necessary, in consequence of the blood being overcharged with both Carbonic acid and carburetted Hydrogen, the nervous substance is first impaired, next exhausted, and lastly its normal activity extinguished.

The muscles meantime through having been robbed of both Oxygen and Carbon—receiving no free Oxygen or very little—and through the presence in the circulating fluid of Carbonic acid and carburetted Hydrogen, lose the power to act. The cerebrum, cerebellum, medulla oblongata, with all the other subordinate nervous centers, being impaired by the poison and the absence of Oxygen,

the nerves of volition lose control, the cerebrum has its will power impaired or entirely subdued, and the cerebellum loses the power of muscular coördination.

Thus, then, the master tissues become crippled. At first alcohol may have a stimulating effect on the nervous system; next, if the indulgence be continued, the nervous forces become exalted; finally, however, depression sets in, and proves at last a complete extinguisher of the intellectual faculties.

The muscles first lose the power of coördination, the irritability and tension gradually cease, at length they refuse to act.

The brain and muscles being helpless, the body lies in a state of stupor, motionless. The individual is temporarily deprived of his mental faculties, incapacitated, and completely oblivious to all his surroundings. The involuntary organs, however, may act. The stomach may eject its contents, having lost consciousness and will power. The urine and feces may pass off involuntarily.

All organs have to suffer, but two more than all the rest—the liver and kidneys.

The function of the liver, as we have already seen, is the secretion of the bile. That organ has still another important duty to perform, and that is in converting the starchy substances, or its already converted sugars, in to glycogen = $C_6 H_{10} O_5$. The metabolic activity of the hepatic cells lies in the formation of glycogene. Glycogene is a source of heat in the body. It is constantly present in the muscle, as a functional material no doubt. The chief purposes this substance serves are probably for respiration and production of animal heat.

We must bear in mind that fats are composed of C, H, and O, and that both fats and carbohydrates serve nutritive purposes. Whether any difference exists between the two we do not know at present, beyond the fact that in the final combination of the two, while carbohydrates require sufficient Oxygen only to combine with their Carbon, there being already sufficient Oxygen in the carbohydrate itself to form water with the Hydrogen, fats require in addition Oxygen to burn off some of their Hydrogen.

Alcohol is not convertible into glycogene. The six atoms of Carbon are complemented by five molecules of water: $C_6 + 5\ O\ H_2 = C_6\ H\{10\}\ O_5$. As already stated, alcohol ($C_6\ H_2\ O$) contains only one molecule of water ($H_2\ O + C_2\ H_4$ ethane). To convert the four of Hydrogen into water, two of Oxygen are needed—and to form Carbonic acid three of Oxygen are wanting.

In this connection we may ask, Is alcohol a food? No! Alcohol is in no sense a food!

As a stimulant it is very useful, in a certain class of exhausting diseases, but taken in large quantities alcohol acts as a slow poison.

The action of the alcohol, which must pass through the liver, is certainly not beneficial. On the contrary, the function of the organ is interfered with and the tissues of which the liver is composed slowly but surely undergo a degenerative process.

The alcoholic beverages differ. As for example, whisky, wine, and beer—of the three beer is probably the least injurious. By reason of the hops it contains it helps to allay nervous irritability. When taken continuously in large quantities, it leads to congestion of the liver and the accumulation of fat. Beer contains only four to five per

cent of alcohol, or thereabout. The effect of beer on some individuals is somewhat similar, in the increase of size, to the remarkable growth of some aquatic plants, as the gourd, in which the vegetable tissue cells are very large and increase very rapidly.

The use of the stronger spirits leads to a degeneration of another kind—contraction of the liver, cirrhosis.

The kidneys are the next to suffer severely by the alcoholic fluids. The whole blood is purified by the kidneys. The transit is very rapid; the elimination of impurities must necessarily be rapid. The body under the normal condition eliminates Nitrogen chiefly; this is the urea and uric acid found in the diurnal excretion of urine of fifty-two ounces in the twenty-four hours. But if instead of a man drinking the ordinary allowance of fifty-two ounces of water, a man takes in several hundred ounces, as in the case of some beer-drinkers, it is evident that the kidneys have a great deal more work to perform than usual, in addition to the constant irritability the kidneys, like the liver and other organs, are subject to.

The sobering up of a man after a drunk, consists in receiving Oxygen sufficient in quantity into the tissues, to supply the amount he has lost. It takes several hours before sufficient Oxygen has been introduced into the tissues to establish the normal equilibrium.

The theories on alcohol are various. I quote some of the more important ones, briefly stated:

Liebig thought that alcohol disappeared by complete and rapid combustion.

Lallemand and Perrin entertained the theory that alcohol was eliminated by the excretory organs. (That means,

perhaps, that alcohol simply promenaded through the system.)

Parks was of opinion that alcohol is directly absorbed by the blood-vessels without undergoing any change or decomposition.

Another theory was that alcohol is converted into acetic acid ($C_2$ H{4} $O_2$); and that acetic acid is split up into carbonic acid (C $O_2$) and water—which is impossible, as there is not Oxygen enough for both C $O_2$ and $H_2$ O.

It appears, then, that alcohol does not disappear by rapid combustion, except when taken in very small quantities and during a state of exhaustion, and then not by combustion. That alcohol is excreted there is no doubt, but when taken in large quantities it is not excreted without leaving its permanent mark behind it. Nor is it absorbed by the blood-vessels without undergoing any change or decomposition, otherwise it would be excreted by the kidneys and skin.

That the function of the brain is entirely suspended, for a time at least, needs no argument, because all will power is arrested, the nerves of special sense cease to act, all nerve-centers suspend operation, and the nerve-fibers no longer act as conductors of either motion or sensation. And the muscular tissues are no longer capable of irritation, stimulation, or coördination; contraction, flexion, and extension have been temporarily annihilated; the force, the power, and the action have succumbed to the harmful influence of alcohol. And the cause of it all is—too much carburetted Hydrogen and the absence of Oxygen. This has unbalanced the elements that normally enter into the composition of the tissue both of muscle and nerve.

The master tissues, the nervous and muscular, that get

drunk, they are the first to feel the stimulation, become excited, depressed, and exhausted.

And finally let us sum up some of the effects of alcohol on the system:

1. It is a source neither of heat nor of energy, nor can it be stored up for future use, nor can it be assimilated in the tissues.

2. Alcohol retards the motion of the blood.

3. It induces specific action after the manner of cumulative poisons.

4. By the veins and absorbents alcohol mixes with the blood, and immediately acts as a stimulant on all the tissues with which it is brought in contact.

5. It causes the retention of substances which ought to be eliminated.

6. It is shown by abundant testimony that the blood becomes surcharged with unchanged and unused material, and contains more Carbon than normally, at times as much as 20 to 30 per cent.

7. Alcoholic blood coagulates slowly and extravasates easily.

8. The susceptibility to disease is greater, the resisting force is diminished, and the healing process seriously interfered with.

9. Oxygen is diverted from its proper functions, the exhalation of carbonic acid at the lungs is diminished, both absolutely and relatively, but the pulmonary aqueous vapor is not lessened.

10. The functions of the brain are at once stimulated, and all other organs are excited, and a train of phenomena is induced partly of a chemical nature and partly of a physical or vital.

11. Alcohol produces a temporary increase of the heart's action, and a congestion of the whole of the pulmonary capillaries.

12. It irritates the parts, stimulating the glandular secretions, leads to congestion of the blood-vessels, in time forms spurious melanotic deposits and a gradual thickening of the gastric substance.

13. Fat gradually is increased in the blood, and a milky character is imparted to the serum of the blood, and the red corpuscles in time assume a wrinkled and contracted appearance.

14. The water of the urine is diminished; the chlorides are greatly lessened, as well as the acids and bases.

Most people are concerned about themselves only to the extent of securing the immediate satisfaction of their senses. The superficial surroundings they utilize to cater to the enjoyment of such indulgences of acquired taste, habit, passion, feelings or emotions, as prove most gratifying to them, never thinking that their constitution is nothing more than a vitalized chemical machine, temporarily passing through its terrestrial cycle of physiological activity, beginning as a mass of protoplasm, and terminating, when it has gone through all the phases of animal existence, in the distribution of its chemical elements.

The deranging effect of alcohol on the nervous and muscular tissues may be compared to the working of an ordinary battery. We know that the action and the force

depend on the elements that enter into the composition of the battery, fluids and solids, zinc and copper, and sulphuric acid—representing zinc, copper, sulphur, Oxygen, and Hydrogen. The action of the zinc and copper depends upon the fluids. Other fluids, though composed of three elements, would produce either not the same effect, or no effect at all. It stands to reason that, since we know the kind of fluid that will set the elements in action, we certainly should be very unwise to use another fluid that will either derange or destroy the battery's working capacity. The forces or force are in this instance produced by the combination of certain elements, and in order to continue the activity or action of these elements one upon the other, a constant supply must be kept up. The mechanism of muscular action, or nervous action, depends upon the supply of certain elements; they are continually replacing elements that are used up in the work they have to perform—that is, the function of brain or muscle. The moment elements are introduced that do not or cannot make up the loss of the working expenditure, that tend rather to disorganize or decompose the tissues, the functions and the natural forces are interfered with, weakened, or may be brought to a standstill.

The effect of alcohol is much the same on all animals. I mean, that the master tissues of the lower animals will succumb to the influence of alcohol as readily as those of a human being. We know with certainty what gets drunk—where is the spiritual part of man? where is the soul? When the brain is intoxicated, its functions are more or less suspended, its controlling or governing action is lost over the muscular tissue, in addition to the muscles themselves being disabled. Both tissues, having been robbed of their elementary equilibrium, consequently cease working. The moment the equilibrium is reëstablished, the tissues assume their functions the same as before. If a given

number of specific parts enter into the construction of any mechanism in order to produce a certain amount of force and effect, the number of specific parts must always be present if the same force and effect is to be realized. Brain and muscle are made up of a specific number of elements; these must be always present if we would have them produce the normal force and effect. When too much Carbon and Hydrogen and too little Oxygen are introduced into the system, as in the case of alcohol, the derangement of these elements is felt in the poisonous effect, because enough Oxygen cannot be supplied to keep up with the demand.

## CHAPTER XXIII.

# THE SOUL—WHAT IS IT?

Dry truth, real knowledge, hard facts, are less interesting, less entertaining, than a plausible fable or a fanciful story. While the latter is listened to, with eagerness and pleasure, the former barely receives ordinary civility and attention. The effort requisite to understand and to think, requires resolution, determination, and fixed attention. The senses are not stimulated, the emotions and feelings not aroused, by mathematical problems or astronomical calculations. The muscular tissues are much more easily trained, disciplined, and educated than the nervous tissues. In the former we see immediate results. There is a pleasure in the pursuit, a palpable satisfaction in watching the muscular action and physical development. The most agreeable part about that kind of exercise, training—or education if you choose—is that it is easily acquired and soon put in practice, and much admired. It has other advantages in addition. The fatigue and exhaustion in consequence of muscular exercise, add no small amount of enjoyment to that already experienced, by having to replenish the spent energies, to fill the demand for new material called for. The gustatory and olfactory nerves are stimulated by odor of the viands provided, and what is still more important, the glandular activity that is set in motion produces an

amount of exhilaration, so satisfactory that it is recognized as one of the principal features for every and on all occasions. “A feast is made for laughter and wine maketh merry” (Eccles. x, 19).

Muscular action, however, cannot take place without nervous action. These two tissues are dependent one on the other. Yet the muscular tissue may be considered as subordinate to the nervous tissue. While the muscular tissue may become totally inactive or incapacitated, or even removed, the brain tissue may retain its activity and continue to perform its functions. The very reverse takes place when the brain is either injured or removed. We know by experience, experiments, that injuries or other pathological changes will cause impairment to muscular tissue.

It is hard to conceive, and harder still to understand, that an animal—man included—is nothing more than a vitalized machine, composed in the first place of two distinct working parts—muscular and nervous—while all the other portions have to perform duty in order to sustain them.

The word function is a term applied to all tissues in general, as kidneys, liver, stomach, etc.; each has its function. So have muscles and nerves. The former has for its function contraction, while the latter has for its function to control and regulate that contraction.

The first part of the machinery is governed and checked by the domination of the other. That dominion, that control, is termed Volition, in other words, will power!

1. *Will power!* What is it? It is a power which every animal possesses, and every animal exercises, in accordance with its particular organization and degree of organic development.

2. Every animal has the power, with the aid of its senses—five senses of sight, hearing, smelling, tasting, feeling—to select substances from the vegetable and mineral kingdom, for its immediate want, for the sustenance of life.

3. It has the power of locomotion to go in search for those substances, and to carry them to a place of safety, for present or future use. It has the power to select the kind of food, to choose that which is beneficial and reject that which is injurious. The five senses direct in that selection.

4. The animal has will power to protect and defend his possessions—through his senses the brain directs and the muscles act.

5. The animal has will power, when the organs of procreation are developed, to choose a partner for the production of young. The senses serve in making the selection, as regards beauty, form, size, etc.

6. It has the will power to nourish and protect its young or to destroy it.

7. Animals have the will power to build their habitation, their home, and furnish it in a manner best suited for their comfort.

8. Animals have the power to articulate sound, and have the will to communicate with each other if they so desire, to antagonize or to quarrel.

9. They have the will power to select from the surrounding elements. They choose water, air, sunshine, high or low altitudes; they migrate from warm to cold, and from cold to warm, climates.

10. They have social intercourse among themselves; have a will power to organize as a band or body to protect

themselves against the attacks of other organized bodies, to fight and to battle.

11. Animals instruct their young—guide them and protect them, as well as feed them. They have their code of morals. They have all such functions as serenading, love-making, music, jealousy, pleasure, and anger. Animals have judgment; they can compare and reflect on cold and heat, danger and tranquillity, comfort and discomfort. They can reject or accept.

12. They have memory, perception, and understanding. Domestic and wild animals exhibit these peculiarities. They will manifest their likes and dislikes, hate and love, courage and cowardice.

The *will power* depends on the nervous system—the cerebral hemispheres, the cerebrum or small brain, the thalamus opticus, corpus striata, corpora quadrigemina, the peduncles, medulla oblongata, spinal cord, etc. That is, all the organs that constitute the nervous machinery, that control the muscular tissues in all their acts, and keep a watchful outlook over all other organs of the body.

The *will power*, then, is the power to act in accordance and in harmony with the things recognized, or the selection made by any of the five senses, discriminating between that which is good for them and that which is injurious, or good and evil.

Animals in selecting grass for food will avoid that which is injurious to them. The olfactory and gustatory nerves guide them. They will seek shelter, and evidently know what to do when a thunderstorm approaches, etc., etc.

Will power is a property, quality, or function belonging to all living creatures in common. The degree of will power

depends upon the quality, quantity, and perfection of the nervous organization. Man has will power in a measure greater as the nervous system is developed, educated, and perfected.

*Morality*—a quality that does not exclusively belong to man. What is morality? It is nothing more than a restraint, or check, on our actions and our feelings. It is the regulating of the actions of life towards ourselves and towards others. It is the obedience to recognized and established laws in a community, socially and politically. It means not to trespass against the laws of nature, against ourselves, or against our neighbors.

Animals restrain themselves and obey.

Morality differs according to the social customs and practices, and the civil laws regulating the same, which were made and adopted for mutual benefit and protection. These are either crude or refined, depending on the condition of society.

To a limited degree animals have morality. Man has it in a higher and more refined degree, according to the progress and culture attained.

*Intelligence*—Animals possess intelligence, if the meaning of it is, to recognize sounds and figures, be obedient to the voice, understand what is said, perform certain acts, execute the will of a master, know the difference between right and wrong, express gratitude, exercise watchfulness, protect life and property, remember places and objects in general, be capable of some degree of improvement, susceptible of training and modification of conduct, etc., within the limits of the nervous power the animal has.

*What is the soul?* Is the soul something quite independent

of matter? Is it a something entire and complete in itself? A perfect part of a perfect whole? Does the soul possess all the excellences and qualities theologians claim for it? Whence does it come? What does it consist of? Has it an existence separate and apart from the body? If so, where? In what state does it exist previous to entering the body? Does every human being receive a like quality and quantity? Has it consistency? density? elasticity? Is there any connection between the soul principle and matter? Spirit and soul, are they one and the same thing, or do they differ? If so, in what? What is substance soul and substance spirit? Is it self-acting and self-existing? Is the soul susceptible to training and education, and the reception of knowledge? Or is the soul already trained, educated, and possessed of all the knowledge that is now known or likely to be known? Does the will power reside in the soul? And is the nervous system subservient to the soul? Is the soul endowed with passions and emotions? Can the soul deteriorate, be injured or be afflicted? In what degree does the soul differ in the civilized and in uncivilized man?

The theological soul has its origin in the Bible, no doubt (from the word *nephesh*, breathing; the Greek *psyche*: Latin *animas*, *chayu*, breath of life).

This word gave the impulse to a vast amount of thought and reflection, both theological and psychological. Discussion and literature followed as extensive as there has ever been on any metaphysical topic.

It may be interesting to learn some of the attributes of the soul. Here is a partial list: “Will, passion, love, joy, grief, anger, mirth, sorrow, revenge, contempt, hatred, honor, pride, humility, jealousy, despair, pity, compassion, love of fame, of music, of the marvelous, of notoriety, avarice, guilt, curiosity, astonishment, respect, desire, cheerfulness,

melancholy, sense of beauty, sense of the sublime, sense of friendship, feeling of delight, selfishness, generosity, etc." The author of this concoction had not a very clear notion of what he was writing about, otherwise he would have known that animals have in common with man most of the emotions above recited. The soul is a display of nervous phenomena, exhibited under certain circumstances, differing only in intensity of expression, depending upon the kind and character of animal and man.

It is one of the common tricks of trade—when theologians argue upon the immortality of the soul, they bring and ring in any amount of biblical evidence to sustain them. They prove nothing. They cannot prove anything. It is the standing puzzle. They try to unravel a mysterious something that is *not* mysterious. Nor is there any need of mystery. What is essential for us to know is the truth, plain natural facts. There is nothing that we need be either ashamed or afraid of. If we have been deluded by errors made several thousand years ago, regarding the dual composition of man, or have been imposed upon and intentionally retarded in the onward progress, it is time to correct the error and remove the imposition. Let us have a clear, intelligent view of things and look at them as they are. This mystery, like other mysteries, can be cleared up by the light of science and modern investigation.

What is the difference between man and animal? Articulate speech and the susceptibility of the brain matter to a high degree of culture.

*Mind* is a term employed to designate the collective acquirements of a man's brain. In proportion as the acquirements are greater or less, the mind is greater or smaller.

These acquirements may be simple, complex, or profound.

They may be biased, general, or scientific; they may be deep, learned, or superficial. They may be only a slight advance above the general animal instinct; or may have assumed a superior intelligence and may have arisen to a higher plane of intellectual qualities.

The acquirement or evolution of mental power and intellectual capacity depends:

1. On the constitutionally inherited capacity and capability.

2. On the size and general conformation of the brain.

3. On the perfect condition of the organs of special sense.

4. On the quality of the nervous structure.

5. On the general physical constitution of the body.

6. On the evenly balanced equilibrium between the vital organs.

7. On the chemical elementary constituents that enter into the composition of the various tissues, especially the nervous tissue.

8. And lastly on the education, training, or culture.

9. I may add, suggestively, on the relative quantity and quality of the gray and white substance of the brain, etc., and perhaps on the depth of the sulci and the size of the convolutions and the general symmetry of the different lobes of the cerebrum, etc.

The brain of an idiot is not susceptible to culture or education. He has all the senses, but of an inferior and imperfect order; a brain insufficient in quantity and quality to be capable of acquiring anything. No mind can be

formed. The idiot has not any intellect. Has he a soul?

Or supposing any portion of the brain is diseased and any one of the special senses ceases to act, as sight, hearing, or any part of the muscular tissue, and the intellect is impaired, either partially or wholly incapacitated, then has the soul suffered any damage, or does the soul remain intact?

Or supposing that a child is born blind, or that some one of the nerve centers controlling certain faculties of the brain is absent, and the education is necessarily limited to the remaining nerve centers, is the soul still complete and perfect?

Or in case of change of structure of the brain substance, as in softening of the brain; or in case of tumors, blood clots (thrombosis), or syphilitic disease, and paralysis either local or general resulting—depending on the seat of the disease—what has the soul to do with it? Or in disease of the meninges (coverings); or in case of insanity, whatever morbid cause might have produced that condition, where is the soul?

Or when, in consequence of morbid changes, the mental and physical expressions, the actions, change, often extravagantly, is the soul affected thereby?

When the body is afflicted with disease, does the soul suffer?

At what period of fetal development is it that the soul enters the body? Or does it enter at birth?

The breath of life is Oxygen. Without that element one could not live. Without it the newly born babe is more helpless than a lower animal. Not a single special sense is

fully developed. The brain substance is not fully developed. The babe has no power to will anything. It has no volition—except the act of nursing, and that is not a voluntary act. The organs over which will has no control are the first to act—an infant soils its linen involuntarily. It imbibes nourishment, as a mass of protoplasm imbibes moisture. It has neither will power nor desire. It cannot select. It has neither knowledge nor conscience. Since none of the special senses is able to act, it has no perception of any kind whatsoever. It experiences only two sensations, pain and hunger. Young birds and other young animals do the same.

Is there anything in this newly born babe of a supernatural character, such as a soul, spirit; the knowledge of God, or of good and evil? Does there exist in this mass of organized protoplasm anything that may be called divine? Is there aught innate? No! Certainly not!

There are what may be termed latent powers—not unlike latent heat—capable of being evolved. You may fashion anything out of it—in the religious line, brutal or uncivilized, etc. It will acquire any kind of speech, from the howling of a dog to the most refined language. It will contract any habit, from that of the lowest animal type to that of the most refined lady or gentleman. You may make either a cannibal out of it or the most fantastic gustatorian. It will either crawl, climb, or walk. It will live anywhere and anyhow. It will either parade nude, be painted, or wear a breechcloth, or wear a swell dress coat, or, if it be a female, a long trailing skirt with all sorts of gewgaws. In religion you may make anything out of this babe. You may make it believe the greatest nonsense. It will believe three gods in one or twenty-five gods in one. It will be a Jew, a Christian, a Mohammedan, or the lowest brute on the face of the earth.

This mass of vitalized matter is susceptible to training. The physical part, the muscular part, always develops and is readily trained. In a primitive state it requires but little discipline to acquire muscular strength. The muscular powers are the first to assert themselves. This master tissue, whenever and wherever it excels, receives honor and homage, and prevails among its companions. In barbaric ages this was the controlling force, the ruling spirit, the governing power.

The nervous tissues require teaching. The senses must be trained, educated, cultured, refined. The impressions received through the nerve-centers by the senses are stored up in the cerebrum. Though they are at first simple, crude, and incomprehensible, habit, use, or repetition enables them to familiarize us with the surrounding objects.

If the brain is fully formed, the infantile education begins. By constant repetition of the same acts, the sense of satisfaction from feeding, and the sense of comfort from cleanliness, are slowly established in the experience of the child.

Hunger, cold, heat, and moisture will cause it to manifest its dissatisfaction by crying. It sleeps twenty out of the twenty-four hours, and wakes only to indicate its wants of either hunger or discomfort. The more regularly it is fed, and the more cleanly it is kept, the more peacefully will it rest and the more soundly will it sleep.

When, however, an infant is born, though physically fully developed, with face fully formed, but acephalous, without brain—that is, when an arrest of development has taken place—the babe cannot live, it cannot breathe, because the principal part of the nervous system is wanting—the medulla oblongata, cerebrum and cerebellum, etc.—though the lungs, heart, and all other organs are perfectly

developed. This arrest of development may take place at any time. It is thus that congenital malformations are produced. Idiots are thus formed, or any other inferior formation of brain may take place. In proportion as the parts are present or wanting—the brain, or rather the nervous system—latent (better, inherent) qualities for future capabilities exist or do not exist. Supposing the optic nerve is arrested in its development, or any organ with which it is immediately connected, the special sense of sight is wanting. Though the eye itself, the organ of sight, may be perfect, all the training and education will never give it capability or skill in arts and sciences. This can never be acquired by that organ. You cannot educate that organ which you have not. Whatever perfect brain formation exists may be trained, fashioned, educated, in any one of the thousands of directions one pleases. It may be given any bent or bias, good, bad, or indifferent—depending upon the influences that are brought to bear on the young brain while it is in the process of developing.

An infant has no mind, intellect, thought, idea, memory, or any other nerve quality that nerve structure is capable of developing.

Talk of soul or spirit is absurd. It does not exist either in infant or in man any more than it exists in a plant or an animal—unless the term is applied to the collective functions of the great central organs, and in that case it would certainly not be supernatural.

At the time when the books of Moses were written—we need not even go so far back as when the fable of creation was first related—they knew nothing of circulation or of respiration, or of the nervous system. It was not even thought of. I believe you may search the Bible from end to beginning and from beginning to end without finding such a thing. No such word as brain is mentioned. What is

known of the nervous system is, comparatively speaking, of recent date.

"What seems most marvelous is, that we, in the nineteenth century, boasting of a high grade of civilization, and, I may say, with all the modern improvements, should accept and still hold fast to an idea that originated in the brain of some barbarian four thousand or more years ago, away down in Mesopotamia (now Turkey) where they are still considered uncivilized. This is certainly very strange.

But ah! that priestcraft!

## THE MIND.

All the organs in the body are capable of performing their functions the moment the child is born. Most organs have performed their functions prior to the child's birth. Circulation, respiration, digestion, secretion, and excretion —these functions are performed at once. These are involuntary, and require no educational training. They are performed while the organism is otherwise entirely helpless.

1. The first few weeks.—

> The nervous system is not developed. The special senses are not responsive—neither sight, hearing, taste, nor smell.
> There are no voluntary muscular movements, no coördinations of muscles.
> Nervous and muscular tissues undeveloped.
> Special senses undeveloped, no recognition.

It has no mind—no faculties, morality, intellect, memory, reason, judgment.
In short, it has nothing innate—no principle of either God, soul, or religion.
No will power. The muscular and nervous tissues are not yet able to perform their functions, except such as are reflex and of an involuntary character.
No expression.

2. A few weeks after birth.—

Impressions of light perceptible.
Sensations slightly improved.
Expression still blank.
No volition.
No recognition.
Cry the only sound.

3. Three months.—

Special senses improved.
The eye steadier. The child begins to recognize its mother, etc.
Utters sounds of satisfaction.
Perceives sounds indistinctly.
No coördinate movement.
Upper extremities more active.
Expression of face improved—smiles.

4. Six months.—

Muscular tissues more developed—crawls.
No coördination of muscular action.
Sight improved—recognizes mother, father, etc.
Excretions involuntary.

Expressions of pain and satisfaction more palpable.
Hearing improved—listens to sounds.
Playfulness.
Makes sounds of satisfaction and dissatisfaction more distinctly. No articulation.

5. One year.—

Special senses more developed.
Coördination still imperfect.
Excretion involuntary.
Upper extremities more active.
Fear manifested.
The dawn of want.
Recognizes a few objects.
Pleasure expressed as well as anger.
Likes and dislikes exhibited in some degree.
Beginning of articulation.
Sounds more distinctly recognized.
Sight more perfect.
Taste slightly developed.
Smell—no discrimination.

A child one year old—(*a*) Recognizes its parents imperfectly. Has slight coördinate movement of the upper extremities, and beginning of coördination of the lower extremities. Manifests its wants by making noises, but has no articulation. Sensations of pleasure, pain, and anger are more plainly expressed. Playfulness is greater. Fear is exhibited. (*b*) It has no mind, no intellect, no will power. No God, no religion, no soul. No thought, no idea, no conscience. No faculties, no memory, no judgment. No knowledge of objects, or numbers. It knows nothing of comparison, relation, liberty, morality, love, hate, shame, joy, sorrow, despair, envy, ambition, pride, etc., etc.

6. Second year.—

The master tissues begin to perform their functions —the muscular and nervous tissues.
Digestive apparatus more completely developed by the appearance of teeth.
All the special senses more susceptible.
Voluntary muscles begin to act, though imperfectly.
Coördination still uncertain.
Muscles of articulation attempt to produce articulate sound—beginning to imitate.
Recognizes some objects; cannot discriminate.
The sense of taste shows signs of development.
The sense of smell—no discrimination.
The sense of hearing recognizes simple sounds—voice.
The sense of sight more distinct.
The sense of feeling slightly improved.
Attracted by bright-colored objects.
Selfishness exhibited—seizes objects indiscriminately.
Shows fear; knows nothing of danger.
Manifestation of affection toward those who care and provide for its comfort.
Excretions still pass involuntarily.
Responds feebly to calls.
Playful.
Cognizant of light and darkness, indoors and out of doors.
Shows signs of preference.
Training begins; involuntary acts checked to a slight extent only.

At the end of the second year the child (*a*) recognizes its parents and others about it. Has coördinate movements comparatively correct of both lower and upper extremities.

May manifest its wants by imperfect articulation. The sensations of pleasure, pain, and anger are more emphatic. (*b*) The will power is slight. The memory is very feeble. Discrimination begins in simple matters.

7. Third year.—

Training progresses.
Coördination complete.
Nerve centers formed.
Will power attempted.
It depends at this age upon the surroundings—the guidance, attention, direction given to the child.
It is more susceptible to impression.
Memory improving.
Perception manifested, but little discrimination.
Articulates more perfectly.
Imitates to some extent.
Excretion controlled.
Playful, active.
All the senses work.
More subject to discipline—obeys more readily.
Teachable in right and wrong of a simple character.
Likes and dislikes more prominent.
Recognizes objects.
Begins to pronounce.

At the end of this period there is no manifestation of anything innate. The child knows nothing. Only the muscular tissues are more active, and the nervous tissues more susceptible to teaching. It has no faculty of any kind.

The functions of the brain are more distinctly manifest through the organs of special sense. The child will become just what you make it; though the latent inherited qualities will give impulse to some directions more than others.

Thus inclinations and susceptibilities are awakened that may lead to greater or less distinction.

All that the child thus far has developed is instinctive, checked and modified by those in whose care it is. The animal nature predominates, and the child at this stage will become a brute if left to itself.

If the proper training, teaching, discipline, or education is from this time forth properly applied and the latent power judiciously brought out, mind and intellectual qualities may be developed—differing in degree and intensity—by the bias or bent given to the functions of the great nervous center. On the culture of this organ depends the kind of creature we may have when full grown in the shape of either man or woman. Any kind of sentiment, belief, or superstition, prejudice, hate, brutality, humanity or inhumanity, good or bad habits, vicious or benign—with no end to the variety, such as we witness among ourselves and among the various nations upon earth—may be inculcated.

It is brain function, brain culture, brain education, that produces greater or lesser minds, that evolves from mere intelligence the highest intellectual powers, that marks the difference between man and man from the meanest savage to the greatest philosopher and scientist.

Brain may exercise will power without training, culture, or education. The muscles may exercise strength without training, culture, or education. It is the systematic attention of the one as of the other, the frequent repetition, steady practice, that produces skill in the one, as in the other; it is the patient application and perseverance in the one as in the other, sustained by constitutional endurance, that makes the expert in the one as well as in the other.

It is the united forces of the master tissues that have produced all that is and was, and will continue to produce all that ever will be.

Soul is the product of the imagination. It has no immortality, because it has no existence.

There are a class of men that are interested in sustaining the delusion; these are the priesthood.

What we want is not the salvation of souls, but the salvation of man.

If soul is the collective name of brain product, or combined result of brain function and education, we need not disagree about the word. But if it is insisted upon that the word soul means something distinct and apart from the animal body, a supernatural manifestation, a supernatural gift or endowment, given to man at birth and to man only, and that this piece of supposed God enters the body at some period during birth and quits the body at death, it is not true! On the contrary, it is false. Man has no soul, nor has any other animal, except that power that is produced by the nervous material. The brain has a function to perform, like every other tissue in the body. The muscular tissue, the liver tissue, etc., each perform their function. The great nervous centers and the special senses, being intimately connected, carry all impressions direct to the brain; the retention of impressions, the memorizing, the recollection, the formation of ideas, of thought, imagination, are the immediate functions of the nervous substance. These are secreted in a similar manner as the pancreas secretes pancreatin; with this distinction, that pancreatin is a fluid, while the quality of nerve function is a force, a power, a manifestation, or phenomenon if you choose. Electricity is a product of a similar nature. There are other forces of a nature similar in character, the result

of chemical combinations.

Let the blood be overcharged with carbonic acid and circulate in the brain, the nerve tissue will at first act irregularly, next very erratically, and finally stop its function altogether. The function of the brain is partially suspended in certain diseases, as in hysteria, epilepsy, and chorea or convulsions. And where there is no brain, or little brain, there is no function or very little function. The variety of brain, with its inequality of size, quantity, quality, the hereditary failings, opportunity, training, education, all, and much more, make up the sum total of mind. As you educate the brain, so the mind will be. It will exhibit energy and endurance, and perform its functions, in proportion as the nervous structure is healthy, the chemical constituents evenly balanced, and the equilibrium of all the organs and tissues of the body evenly and smoothly maintained, so that the molecular and chemical or vital and nervous elements of the brain perform each and every one its proper office.

There is no immortality of the soul, nor is there such a thing as death of instinct. There is nothing immortal except the elementary substances, proper; they cannot be destroyed. All live bodies function, no matter how small or how simple; complex bodies also function, and each and every organ that enters into the composition performs its function.

Every phase, every phenomenon, is a manifestation of matter. Thunderstorm, lightning, electricity, or thought—whatsoever it may be, call it by any other name, designate it or describe it how you will, we cannot separate any object from this terrestrial globe of matter. The elements composing this world gave birth to life, life manifests its energies in many forms, then returns again to the great ocean of elements whence it came.

No soul you will ever find,
Trust not in its life or death;
Education makes the mind;
Oxygen is the life's breath.

## CHAPTER XXIV.

# SIN AND SALVATION.

What is sin? If we are able to ascertain what sin is, we shall probably understand why salvation should be extended to the one that sins, or to a community of sinners.

Everything has a beginning. We draw our deductions by comparison. Men judge in part by their own experience, and in part by the experience of others. We see what is going on in our daily active life, how every work or enterprise, society or society reform, is started and set in active operation.

Every beginning is crude and awkward. Rules adopted to govern a family circle, jar and chafe when introduced to govern larger bodies of individuals. What may seem good for a household government would hardly be suitable for a community, and the rules regulating the general community would hardly be available for a people or a nation.

Modifications in the rule of conduct are inevitable as families or communities increase numerically. They may be slow, imperceptible, and cause little disturbance. But sudden and radical changes produce quite another effect.

They may cause simple irritation or friction among the elements composing the family or community, may cause temporary embarrassment, or may cause an eruption with considerable commotion, and accompanied with more or less serious effects.

Change in the methods of conducting and regulating the affairs of mankind, individually or collectively, in small family groups or in large communities, has ever been a matter, not only of great interest and deep concern to mankind, but also of bitter dispute, conflict, and hostility.

It has ever been thus, from the time intelligence superseded instinct, with attempts to introduce innovations, new or improved methods regulating the conduct of either individuals or communities, or the general affairs of man. Individual must yield to family, family to community, community to people, and people to nation.

Rules once established, no matter how rude, vulgar, or barbarous, or how enlightened and beneficial, were adopted to secure a general uniformity of conduct or line of action for each individual or family belonging to the community or people, for what was considered the best interest of the whole, and their mutual benefit and safety.

The most primitive rules were instinctively adopted in the lower order of animal life, the laws of self-preservation and mutual protection.

The individual conduct, in either family or community life, is governed accordingly. That is very evident, and requires but little observation to find the secret spring that explains the necessity for its existence.

If a community, whether animals or men, are favorably located, have ample provision and comfort, they will live

in peace and contentment, thrive, develop, without friction or trouble. Let a lack of food arise, or let the numbers increase and produce a scarcity, strife is inevitable. New, other than peaceful, methods are adopted. Either they quarrel and battle among themselves, or they go in search of food elsewhere—emigrate, in part or as a whole. If they meet with opposition, they will fight—the strongest takes possession, might asserts its right, and the conquerer becomes the ruling power.

In the early stages of human civilization, thousands of years ago, the simplest primitive rules were established for the conduct and guidance of the individual living in the community—for, of course, mutual protection and self-preservation. Humanity in a barbarous state adopted these rules, and handed them down from generation to generation until at length they were codified into laws. What are they?

Honor thy parents.

Do not commit murder.

Do not take another man's wife.

Do not bear false witness.

Do not take anything belonging to another.

These are laws for self-preservation and mutual protection! If such simple rules were not recognized and established, neither life nor property would be safe. Destruction of life and forcible possession of property would naturally lead to extermination.

The family union is instinctive. The father, like the leader of a flock, is in authority. He is feared, therefore honored.

A community soon learns from experience that "in union is strength." Herds of cattle seem to know this, and are ever ready to protect and defend themselves collectively.

The lowest savages, barbarians, observe among themselves the first, yes, primitive rules to govern them in community, in family.

These rules arose from necessity. It was for each individual's interest, for family interest, and for the interest of the community at large, to adopt these rules, obey them and have them obeyed. These rules were for individual welfare, and for the common welfare of the community at large, the preservation of their lives and the protection of their life and property.

So long as any community of human beings, whatever be their condition, have ample provision to satisfy their wants, and are secure from depredations from without, there will be no trouble. Happiness and contentment, as well as peace and prosperity, will characterize their state.

As to the relation between males and females, that regulates itself. All communities, barbarians and savages, have always some general recognized rule to guide them. Female chastity is secure among all nations, high and low, civilized and uncivilized, whether they are decorated in a complete suit of nudity, a gauze covering, or a ball-room dress. There is no necessity of going back four or five thousand years. Cæsar relates (Lib. vi, 21) that the Germans were in complete undress costume when bathing promiscuously; yet they had their customs of marriage and marriage ceremonies. In this country we have had the same customs and may have again. When Columbus arrived at one of the islands of the Caribs, 1494, a cacique and his family paid him a visit. This family consisted of two daughters, five sons, and five brothers. "One of the

daughters was eighteen years of age, beautiful in form and countenance; her sister somewhat younger; both were naked, according to the custom of these islands, but were of modest demeanor" (Irving).

As a further illustration I quote from Irving's description of the people that Peter Martyr met with. He relates: "It is certain that the land among the people is as common as the sun and water; and that 'mine and thine,' the seed of all mischief, have no place with them. They are content with so little, that in so large a country they have rather superfluity than scarceness; so they seem to live in the golden world, without toil, living in open gardens; not intrenched with dykes, divided with hedges, or defended with walls. They deal truly one with another, without laws, without books, without judges. They take him for an evil and mischievous man who taketh pleasure in doing hurt to another; and albeit they delight not in superfluities, yet they make provision for the increase of such roots whereof they make their bread, content with such simple diet, whereby health is preserved and disease avoided."

Possibly somewhere on the African continent there may still exist a people that live a life as simple and as happy as those in the time of Columbus. But everything must yield before northern energy and Christian greed; besides, the new-comers need the land for their surplus population.

May we not ask, Is not our present high state of civilization the natural outcome of our necessities in the struggle to exist? Is not our high state of nervous development largely due to that struggle?

Indolence and inactivity produce nothing. Activity and diligence produce and invent all things.

All wrongful acts committed are either injuries done to

ourselves, or injuries inflicted upon others.

Injuries done to ourselves are not necessarily sins. Onanism, for example, is unquestionably injurious, yet is not recognized as a sin. It leads to the insane asylum, and in many instances underlies religious insanity.

There are other disgusting practices that are neither injurious nor recognized as sins.

The stomach commits no sin, but leads nevertheless to many wrongs, to one's self.

All crimes are sins, but all sins are not crimes. And all injuries done to others are accounted both sins and crimes.

What seems very strange yet is wonderfully true is that all sins and crimes against others find their origin in the indulgence of either stomach or sexual organs.

Starvation may lead to crime. Hunger often drives to theft. Extravagance, lust, and luxury lead to any variety of crime, from forgery to appropriating another man's wife.

In the gratification of those two organs, passions, we find the cradle of all crime.

And what we call morality means the proper regulation of these passions, of these organs.

The church occasionally takes cognizance of sins, when discovered, that do not come within the category of crime, as was seen recently in the case of a Major Theobald who seduced his niece while nursing his invalid wife; he was suspended for one year, but saved his soul!

All our civil justices in the city of New York are kept busy to regulate and to punish overindulgences of the stomach

and some other petty wrongs. Our criminal courts are kept busy in punishing those who have wrongfully appropriated other people's property, or injured or killed another.

The superior civil courts attend to the disputes about property.

Why do those who adopt for their mode of livelihood the profession of theology want to exercise salvation? What have they to save?

Let us examine for what sins the Deluge was brought, Sodom and Gomorrah were destroyed, and Christ was crucified.

The principal scriptural sins:

Cain commits murder, from jealousy, because God preferred meat to vegetables (Gen. iv, 8).

Gen. vi, 5: "And God saw that the wickedness of man was great in the earth, and that every imagination of the thoughts of his heart was only evil continually." The contents of this sentence is absurd. The heart cannot imagine, or think. The function of the heart is the circulation of the blood.

What this wickedness consisted of, we do not know.

History has no record exactly where this Flood or Deluge took place. That it was localized is certain. It was in all probability nothing more than an overflow of the river Euphrates—that is joined by the river Tigris, and terminates in the Gulf of Persia—in consequence of a series of consecutive rainstorms, etc., and God had as much to do with this supposed deluge as he has to do with any deluge in the Mississippi valley when that river overflows.

Gen. vi, 6: “And it repented the Lord that he had made man on the earth and it grieved him at his heart.” Now we are getting at God’s anatomy!

Man may labor under delusions—hear voices, etc. All those extravagant statements are perfectly excusable from our modern standpoint.

All this wickedness is supposed to have taken place 2348 before the Christian era, and we have still the same sort of wickedness on earth as there was then. Barbarians inhabited that region—rude, crude, half-civilized herdsmen, not much superior to our Indians. Minding their flocks and increasing their families was their main occupation. Abraham made no scruples in cohabiting with Miss Hagar, Sarah’s maid; nor had Jacob any objections to Miss Bilhah, Rachel’s maid, nor did he scruple to accommodate Miss Zilpha, Leah’s maid, and later we read how Reuben lay with Bilhah, Jacob’s mistress. Shechem seduced Dina, Jacob’s daughter. Her brothers Simon and Levi killed all the males, etc. At this time, we learn, harlots were in fashion.

We have it recited, crime after crime—according to our modern notions—yet these barbarians were God’s own people! After killing Shechem, and Hamor his father, and all the rest of the males, they took possession of their property. Lot and his daughters is another instance of biblical ethics.

This barbarian family, these shepherds, had their first experience in civilization when they reached Egypt, and whatever they practiced later was adopted from that nation. They had received some training under Egyptian rule for nearly four hundred and thirty years. During this period we hear nothing of sin or transgression. No sooner were they organized as a community than the sins, transgressions,

and wickedness broke out anew, and continued right along in a greater or lesser degree through the patriarchal period, theocratic period, and monarchial period. During the entire national existence of nearly one thousand years to their captivity, we have recited sins, transgressions, and crime, crime, transgressions, and sin; and all are perfectly human, perfectly natural among barbarians, savages, half-civilized, and even civilized people. Whether David lusts after a nude woman, or Amnon forces his own sister, it reveals the weakness of animal human nature, and is a breach of the recognized laws, and a lack of discipline.

All through the Old Testament the same story is repeated —sensuality, cruelty, and crime; and rebellion against the established laws. It is the burden of song and of prophecy —greed and scramble for power, the cause of continual dissension. The only time the Jews were reasonably quiet was when they were exterminating other nations, plundering and taking forcible possession of their women and female children as well as their property. The great burden of sin throughout the Old Testament consists in the infringement of the law established by Moses, to worship no other god except the one he manufactured—that is, a God endowed with all brutality and sensuality, without a representative form, a God that had all the senses and could utilize them. The wooden idol had these organs but could not use them, while the Mosaic God had them not but could exercise all the functions of animal life. In the light of history, all ages display the same process in the human mind—the same passions and the same tendencies, held more or less under restraint, according to the laws, customs, and habits of the people. The Jews during their whole career were more or less idolators, and were continually relapsing into the idolatry, of some one kind or another, of dead men, which was practiced under different celestial or animal emblems in the neighboring countries.

And it was not ended until after the Babylonish captivity, 588 B.C., and when Ezra returned to Jerusalem, 557 B.C., who collected the various manuscripts and put them into some sort of shape and started to rebuild the Temple. This event took place during the reign of Xerxes son of Darius. Ezra and his companions had been educated meanwhile. They had enjoyed the privilege of a Babylonian education. They had the advantage of their learning, their philosophy. Now they returned better equipped mentally than ever they were before their captivity. And for the first time they began to call themselves "holy seed" (chapter ix). They had intermarried with the Canaanites, Hittites, Perizzites, Jebusites, Ammonites, Moabites, Egyptians, Amorites, etc., (verse 2) "so that the holy seed have mingled themselves with the people of those lands." Verse 6, this priest goes into hysterics: "O my God, I am ashamed and blush to lift up my face to thee," etc. Chapter x: He prays, confesses, and weeps and casts himself down before the house of God, etc. Verse 11: "And separate yourself from the people of the land, and from the strange wives." Of course their wives were sent adrift. That was the first time in their history that marriages were restricted to their own nation. This also is the first wholesale divorce on record. Intermarriages they had been guilty of for many centuries, and they were never accounted a sin until the time of Ezra. After this reformation the same sins continue, intermarriages perhaps excepted. The animal predominated, as it naturally would. Selfishness was more prominent than ever. They knew the value of gold, and onyx stone, and bdellium. God had told them all about it in Gen. ii, 11, 12. The commercial enterprise started with creation, and has continued. Jehova had not half the romance and the poesy of Zeus or Jupiter. The latter had all the Grecian refinement, while the former had all the barbarity of Chaldea.

Thus, the identical sins continued through the remaining centuries until Christ made his entry on this world's stage. He came opportunely. It was at a time of great agitation. Judea was a Roman province. Pontius Pilate was governor. Corruption, fraud, and crimes of all descriptions were practiced and flourished. The Temple served as a place for barter and business. Sedition, parricide, greed, and seduction were the ruling crimes and passions. Fanatics, heretics, and blasphemers were abundant. There were any number of religious factions, quarreling and fighting among themselves, hating one another heartily, and doing one another as much mischief as in their power lay. The frequent contact with foreign invading nations brought new notions, new customs and usages. New ideas consequently developed—sins and salvation of souls. And humility and meekness were put forth against arrogance of wealth, domineering, and priestly oppression. Communistic and socialistic ideas are always a prolific field for the hungry, poor, and starving. "Give us this day our daily bread, and forgive us our debts," etc. (Matt. vi, 11, 12). Christ's camel and needle story confirms it. The result was he had a following, preached reformation, and accusation and persecution put an end to his life. It had taken root, and a new sect was formed.

Was his life sacrificed for the sins of humanity? Nonsense! This young man's death has not relieved any one, much more all future generations, of their sins. What? Sacrifice a man to God in place of sheep and cattle? So long as men have senses and passions, so long as we have extremes of poverty and wealth, sin remains.

The prevention of sin has never been the function of the church. The trespasses of the natural laws were not properly understood, and the masses are not educated up to that standard even now. Each man and woman pays the penalty if he or she trespass against her or himself; and if

they trespass or sin against another, our civil laws take care of that part.

Has humanity improved since the coming of Christ? Where do you find it? In the history of the Catholic church?

They have two kinds of sin, mortal and venial sin. Mortal sin entails spiritual death. Venial sin does not. Mountains of literature have been written upon that one subject. Hundreds of thousands of men have assumed the task of salvation for nearly two thousand years. What have they accomplished? What have the popes, bishops, and priests done? And what are they doing now? Of what use are they? They have been more of a curse to the world than a benefit. We are too busy to look back at popish history, the power, the ignorance, the superstition, the darkness, and the persecution that overshadowed the world during the popes' tyrannical and bloodthirsty rule. Greed, the chief characteristic of the churchmen, readily finds means to raise money for their use and benefit. In 1517 they sold indulgences for past and future sins. Every crime was pardoned. Luther and reformation came. Did this change or eradicate the evil? No! God, Christ, Holy Ghost, Virgin Mary, etc., assumed only a milder role, only a slight transformation. The Catholic church has been the greatest curse of any church that ever existed. They started their anathemas (curses) at Nice 325 A.D., and have continued cursing, through the twentieth council at Trent, 1546 A.D., and still continue. Their power has to some extent been modified, but the spirit of intolerance only slumbers. They readily accommodate themselves to circumstances. If they cannot rule the nation, they will seize the schools and train the young, inculcating obedience to the church—that the youth shall be subservient to the priest and yield up their earnings to the pope's treasure. These are supported by the masses, assisted by the state, to teach stuff like the

following sample:

## THE LITANY OF THE BLESSED VIRGIN.

We fly to thy patronage, O holy mother of God! Despise not our petitions, but deliver us from all dangers, O ever glorious and blessed Virgin!

Lord have mercy on us.

Christ have mercy on us.

Lord have mercy on us.

Christ hear us.

Christ graciously hear us.

God the father of heaven have mercy on us.

God the son, redeemer of the world, have mercy on us.

Holy Trinity, one God, have mercy on us.

Holy Mary,
Holy mother of God,
Holy Virgin of Virgins,
Mother of Christ,
Mother of divine grace,
Mother most pure,
Mother most chaste,

Mother undefiled,
Mother unviolated,
Mother most amiable,
Mirror of justice,
Seat of wisdom,
Cause of our joy,
Spiritual vessel,
Mother most adorable,
Mother of our creator,
Mother of our redeemer,
Virgin most prudent,
Virgin most venerable,
Virgin most renowned,
Virgin most powerful,
Virgin most merciful,
Virgin most faithful,
Vessel of power,
Vessel of singular devotion,
Mystical rose,

Tower of David,

Tower of ivory,
House of gold,
Ark of the covenant,
Gate of heaven,
Morning star,
Health of the weak,
Refuge of sinners,
Comforter of the afflicted,
Queen of angels,
Queen of patriarchs,
Queen of prophets,
Queen of apostles,
Queen of martyrs,
Queen of confessors,
Queen of virgins,
Queen of all saints,

Etc., etc., etc.

} Let us pray.

From the time of Luther up to the present, God, Christ, Holy Ghost, Virgin, etc., have been toned down considerably, until there is indeed very little left except a shade of God. Our creeds now that have dismissed Christ, Holy Ghost, and Virgin, yet retain a hazy something which they still call God. The most erratic of these denominations yell themselves hoarse with shouting Sin and Salvation!

The modern kindergarten of Protestant fashionable church organizations, the society churches, the scholarly preachers, entertain their congregations with a novel sort of oratory and classic music. These represent a God at ease, a gentlemanly and mild sort of a God, with a constant

aristocratic smile round his lips, as irresistibly attractive as money can make him.

Strong drastic terms, as purgatory, hell, and brimstone, are seldom heard. That sort of doctrine is usually reserved and dished up in furnace-like fashion to the poor, half-starved, ignorant sinners.

## CHAPTER XXV.

# THE ECCLESIASTICAL KINDERGARTEN.

What shall we do to be saved? is a question asked by every religious fanatic.

Saved from what? Ignorance? Superstition? Bigotry? Or stupidity? From idiocy or imbecility? Or, are we to be saved from poverty, hunger, starvation, misery and wretchedness, distress and degradation? Barbarism, savagery, or uncivilization does not enter into consideration of these unfortunate conditions. They exist right in the midst of us, in the highest centers of human civilization. Of what good is the talking of spiritual welfare, salvation, and heaven to a hungry stomach? Of what good is it to grow eloquent over celestial conditions when the poor wretch has sunk into the mire of sloth and apathy, when darkness, misery, and disappointment hang over him like a pall at a funeral? Is this the man that is sinning—when tempted to steal some trifle to satisfy hunger? Self-preservation is the first law throughout organic nature. This poverty-stricken individual occupies the lowest strata of civilized life. He must be civilized—for the law makes him so. The starving must not eat, unless

charity extends a helping hand. In the state of want and helplessness, all the inherent failings loom up into prominence, and aid to weaken the little resisting force remaining to withstand the temptation of wrongfully supplying his wants. The higher indulgences, either gustatory or sexual, are not within reach of the hungry and depressed; and salvation contemplated in the pleasures derived from overindulgence or excesses certainly does not apply to them. The class of persons in a position to satisfy both digestive and sexual pleasures we find in quite another catalogue of sinners. For some of these there is no salvation, for others there is what may be termed a reparatory saving power, viz., confession and atonement, for which the spiritual part of the body is not held responsible, but only the flesh.

It is precisely the men who practice these flesh-begotten sins which the church from the time of St. Paul to the present period has been trying to save, with little or no success.

St. Paul is the man who contributed more towards laying the foundation for the entire Christian system than any other man in the Bible. Of course he claims to be an Israelite of the seed of Abraham and of the tribe of Benjamin. Jesus was of the same tribe—and probably the other apostles that figure in the New Testament belonged to the same tribe. That tribe is of mixed blood on the mother side. Whosoever desires to be fully informed upon that subject, let him read Judges, xix, xx, and xxi chapters —a story of licentiousness, barbarism, and butchery the like of which cannot be found in any history. A Levite with his concubine or wife came to Gibeah to lodge overnight. Some Benjamites used and abused the woman till she died. The Levite cut the woman up into twelve parts and sent one part to each tribe. Israel came together in battle with the Benjamites and slaughtered man, woman, and child.

Six hundred men escaped to the wilderness, unto the rock of Rimmon. Israel had sworn not to give them their daughters to wife, so they helped them to get wives elsewhere, by means that are very interesting, very savage, and very godly. I simply mention this incident to show that the tribe of Benjamin was of mixed blood. It was not what would be called a natural divine selection, but a forced.

Paul with his half-Grecian ideas, whose mind was permeated with Grecian philosophy, used it largely in his argumentations, theologico-philosophic, and in his epistolary correspondence to enlighten and instruct his disciples.

The Israelites or Jews up to the time of Christ were not by any means a spiritual nation. They had a god of the flesh; a sort of cannibal god; a politico-religious god, in whose name every kind of horror and brutality was committed. This was not Paul's God. The garb of Socratic and Platonic philosophy adorns the spiritual phase of Paul's idea. The dual existence is distinctly set forth (Cor. xv, 44): "There is a natural body and there is a spiritual body." "For the spirit itself beareth witness with our spirit, that we are the children of God" (Rom. viii, 16). "Likewise the spirit helpeth our infirmities" (26). "For if ye live after the flesh ye shall die" (13). "For as many as are led by the spirit of God, they are the sons of God" (14). The notion of Paul throughout his epistles of what he terms flesh and spirit, separating them as two distinct parts of the body, and as having a dual existence, on one side the spiritual, the godly, on the other the fleshy, the sinful, the earthly—is due to the educational doctrines that then were in vogue. The anatomical knowledge was limited, and the physiological workings of the nervous system, the functions of the brain, were entirely unknown. The flesh and spirit were the representatives of the muscular and nervous tissue, flesh of the muscular, spirit of the nervous.

One of the most mysterious or hidden secrets was this function of the brain. The absence of any positive knowledge of the nervous system until recent times, caused many errors to creep in, and many false impressions were received by mistake; and these blunders through ignorance have remained to a very considerable extent fixed and unaltered.

Grecian philosophers who were attempting to give a reason, or account, for the various mental phenomena, came to conclusions which are to-day seen to be contrary to scientific truth. He, Paul, embodied in his writings all the speculative philosophy known at his time. This dual existence had been taught among the Greeks for several centuries. When Paul wrote to the Romans he was in Corinth, and when he wrote to the Corinthians he was at Philippi, Macedonia. The rest of his epistles were written partly from Greece, but mostly from Rome or Italy.

Nowhere in the Old Testament is mention made of spirit and flesh after the manner of Paul. They had no knowledge of Grecian philosophy. Of course the mental condition had undergone some changes from the time of Ezra to Christ. Numerous sects had paved the way, and the ideas of various nations had been exchanged. A wonderful metamorphosis had taken place in the God during the one thousand five hundred years that passed between Moses and Paul. The ideal of Moses was a barbarous, cruel God —a determined, imperative, imperious God, that had a purpose in view, a nation to form, a country to conquer. The prince of Egypt, the successful general of a victorious army, talks; every word is a peremptory command. The strong, powerful will of an energetic man stands behind Jehova. There is no philosophy, but all action. No ideality, but muscular force. No humbleness, meekness, or mildness, but the stern exercise of a power that never flinches in any undertaking; regardless of consequences;

pitiless in battle; fearless in the struggle, once determined must reach success. There is no display of imagination, no spiritual reflection, no refinement, but there is only the coarse, vulgar, savage God of Chaldean-Egyptian modification.

The God had undergone changes in the mental agitation of the times, and Paul had accepted the God as he conceived him, through teachings then prevalent. An orator for a reformation, the cause of Christ he had embraced, coupled with the learning of the Grecian literature, his imagination led him to portray his God in the abstract—a refined ethereal being—in truth, a gentleman of a God.

Paul was the real founder of the past and modern church system, the giver of ideas, the furnisher of numerous themes that gave impulse to any number of shades of the various sects now in existence, the promulgator of modification, the pleader of a cause, the moralizer, the humble adviser and counselor of the lowly, ignorant, and poor. He was very earnest and sincere in the cause he had espoused, and, if anything, proud of it—"For I am not ashamed of the gospel of Christ: for it is the power of God unto salvation to every one that believeth; to the Jew first, and also to the Greek" (Rom. i, 16). Next to Jew he was Greek. No wonder that his mind was tainted with Grecianism. His God was an alloy of Greek and Jew Gods. The Greek philosophy helped to refine and eliminate the barbarism and brutality out of the Mosaic God.

Our modern mountebank preachers have nothing new to agitate and talk about in their fashionable decorated kindergartens of Christianity. They are ever spinning round the same circle. They are sensational, mouthing and gesticulating before a crowd they wish to entertain, and for this they are very handsomely housed, fed, and otherwise recompensed. They are the greedy theological leeches of

humanity. They suck the blood, but give nothing in return. Have they advanced the cause of humanity? Is humanity any wiser to-day than these poor ignorant creatures were at the time Paul was trying to get a new idea into their untutored brain?

Here is a partial list of Paul's complaints (Rom. i, 29, 30, 31): Being filled with all unrighteousness, fornication, wickedness, covetousness, maliciousness; full of envy, murder, debate, deceit, malignity, whisperers, backbiters, haters of God, despiteful, proud, boasters, inventors of evil things, disobedient to parents, without understanding, covenant-breakers, without natural affection, implacable, unmerciful. For nineteen hundred years these Christian saints have been trying to convert the world—Jews included, for indeed they needed it—and what has been accomplished? Does your kindergarten church teach aught that corrects the above evils? Have you made them all into saints?

Paul's argument about circumcision is very ingenious. He proposes an inward circumcision for the outward—heart and spirit (Rom. ii, 29), circumcision through faith. His doctrine, the wages of sin is death but the gift of God is eternal life (Rom. vi, 23), is very mischievous. It leads men to give their flesh a full swing and leads them to a satiety of pleasure and satisfaction of earthly bliss—lust or licentiousness, and they let the godly or spiritual part take care of itself. This is not education, but stupefaction. Yet our civilized spiritual purveyors of the soul are still chewing the same theological cud of nineteen hundred years ago. Every transgression against ourselves, against our own body, is a transgression against the law of nature, and the body must pay the penalty. Paul (Rom. xiii, 13) says, "Let us walk honestly, as in the day; not in rioting and drunkenness, not in chambering and wantonness, not in strife and annoying." Paul was a great believer in

spiritual gifts. Cor. xii—this chapter has given rise to more crazes, frauds, and cheats than Paul ever dreamed of. Verse 4: “Now these are diversities of gifts, but the same spirit.” Verse 7: “But the manifestation of spirit is given to every man,” etc. Then he enumerates the gifts—faith-healing, miracles, prophecy, discerning spirits, speaking divers kinds of tongues, interpretation of tongues, etc. (Cor. xii, 9, 10). This of course opens a wide field for imposition and charlatanism. Paul being an authority, cranks and “fakes” are not slow in taking advantage of it. A very large percentage of the masses are ignorant, easily made superstitious and bigoted. Any nonsensical idea is swiftly impressed. They are satisfied with anything they are told—content with a filled stomach and salvation hereafter. This heavenly promise is an immense thing, an ecclesiastical bonanza. For thousands of years, it has been an extraordinary source of income. Hundreds of thousands have lived in ease and luxury, have enjoyed heaven on earth, and let their poor ignorant dupes enjoy the hereafter.

Paul also gives the Catholic church a right to use the anathema. Cor. xvi, 22: “If any man love not the Lord Jesus Christ, let him be *Anathema*, maranatha”—”*Let him be accursed*.” The Roman Catholic church has made good use of it. From the time the Nicean Council was held every one of their canons—as their rules are termed—is accompanied by an anathema for every man that does not think, say, or believe as the church or its priests dictate. The church institution is so well organized and the system so well regulated, that they possess the means of squeezing the last cent out of poor ignorant parishioners. They have so many trapdoors to catch the weary simpleton, that if the money does not come through mass, it will come through indulgence, or unction, or sacrament, or anything and everything. They dispose of their spiritual wares at all prices—anywhere, everywhere, and at all times. Here is an

instructive example of teaching:

"What is the blessed Eucharist? *Ans.* The body and blood, soul and divinity of Jesus Christ, under the appearance of bread and wine," etc.

The immense amount of evil done by this church is something enormous to contemplate. If a papal medal in honor of the massacre of St. Bartholomew's could be found and put up at auction, it would fetch a small fortune. Literature was almost completely suppressed by this church, by laws published under the seal of the supreme pontiff. How few at the present day know anything of the history of the Catholic church. Their past, their terrible black past, with their God, their Jesus Christ, their Holy Ghost, their Holy Virgin, and their saints—what arrogance, ambition, pride, selfishness, greed, tyranny, licentiousness, terror and torture of the Inquisition, bloody crimes and massacres, they were guilty of! Reflection on these many diabolical outrages makes one's flesh creep, and one wonders why such an institution has not been swept from the face of the earth centuries ago. Have they done any good upon earth? From the time of Moses until after the time of Luther, yes, up to the present time even, they have been continuously thrusting their idea of God into the minds of man with the sword, through blood and slaughter, with what result? Has humanity improved? Paul has much to say about the frailties of human nature (2 Tim. iv, 2, 3, 4): "For men shall be lovers of their own self, covetous, boasters, proud, blasphemers, disobedient to parents, unthankful, unholy, without natural affection, truce-breakers, false accusers, incontinent, fierce, despisers, traitors, heady, high-minded, lovers of pleasure," etc. The quarrels, dissensions, and protestations of the present day among the teachers and preachers of Christianity are a topic of entertainment in our daily press. Heresy, blasphemy, money disputes, Briggs, Smith, Corrigan,

Wigger, etc.—what is it all about that will benefit humanity? Priest and preacher, the modern teachers of the theological kindergarten, have not advanced any in their methods. The civil law holds them in check and keeps them within the bounds of their vocation. Women, the decorations and attractions, the most numerous supporters of all church enterprises, are not held in very high estimation by Paul. 1 Tim. ii, 9: "In like manner also, that women adorn themselves in modest apparel, with shamefacedness and sobriety; not with braided hair, or gold, or pearls, or costly array." Verse 11: "Let the woman learn in silence with all subjection." Verse 12: "But I suffer not a woman to *teach* nor to usurp authority over the man, but to be in silence."

The church kindergarten instructions are based upon the writings and teachings of both the Old and the New Testament. Who wrote them, or who compiled them, matters little. They are the accepted doctrines of the church or churches. Whether orthodoxy or heterodoxy, whether monotheism or polytheism, whether the idolatry of calf or idolatry of the figure of Jesus or the Virgin, it amounts to one and the same thing. It is of no serious consequence whether Paul actually wrote the Epistles or some one wrote them in his name several hundred years later; or whether John wrote his Revelations; or Moses the Pentateuch; or whether the whole Bible was compiled a thousand years after Moses. The whole fabric is based upon error, partly due to the times when it was written, partly due to the state of civilization, to the educational status, to the ignorance and superstition of the times, the limited knowledge of nature, and the undeveloped mental faculties, the misinterpretation and misconstruction of every phase and phenomenon their perceptive faculties were unable to explain, the impressions received from the outward world or the feelings and emotions that agitated them within. It is

no easy task to overcome the prejudices of the times in which we live. We are instinctively opposed to any innovation, whether the new ideas are an improvement on the old or not. For many generations, and for centuries, the various church organizations have been teaching the old, antiquated idea that the Bible was a supernatural production, that either God had written it or had inspired man to do the work. What does it signify who wrote Æsop's fables, Homer's Iliad, the five books of Moses, Isaiah, or the New Testament, or even Shakespeare? They are written. The question really is, whether the contents are true, are fabulous or historically correct. For many years it has been a recognized fact that the Bible is a composition of fable, fiction, facts, misunderstanding, and misstatement. We only need glance at the absurd trials that are now going on at this present time. These gentlemen, Briggs and Smith, are not the first to doubt the truth of the book. Hundreds have doubted before them. It is skepticism that produces evolution and revolution in the accepted form of worship and faith and belief. Abraham, Socrates, Christ, Luther, and hundreds have doubted. They were skeptics in consequence of a superior insight into the propaganda of certain accepted beliefs. Every speculative theory has been doubted. Great sciences are never doubted. Theology, the offspring of idolatry and mythology, is a purely speculative science—if indeed it can be classed as a science. Therefore, it has always been laboring under a cloud of doubt. What wonder, then, that modern scholars, even clergymen, of superior ability, become skeptics when they compare modern science, modern truth, with ancient fable and falsehood? The debates on progressive sanctification, a middle state, whether sanctification is complete or incomplete at death—where is the heresy? where is the blasphemy? What are these overgrown, lopsided educated men thinking about—these self-constituted righteous bigots, what are they squabbling

about? Was not Abraham a heretic and a blasphemer to the Chaldeans, Jesus Christ a heretic and a blasphemer to the Jews, Socrates a heretic and a blasphemer to the Greeks, Luther a heretic and a blasphemer to the Most Holy Apostolic Roman Catholic Church? Why, the entire theological doctrine, the whole spiritual code of morals, all the articles of faith and creeds and canons of the church, all the figures and carvings of Christ, all the paintings, all the steeples, all the belfries on this earth's surface—what are they for? What are all the mountebank church costumes for? What is the use for a man to disguise himself in a stage costume of the Egyptian period, to scare a lot of ignorant boobies? Of what use are your incense, your prayer, and your blessing, your self-conceited holiness, your pretended sanctity, and your priestly hypocrisy? What is it all for? To save sinners? What shall we do to be saved? All this ecclesiastical humbug, preaching and pulpit noise and theological humbug, is about crushing out sin, saving the sinner, and all the supernatural thunder is brought to bear upon the great sinning organs—to wit, *the stomach and the sexual organs*, to regulate these. God and gods, angels, prophets, and spirits labored—and what is more monstrous and more extravagantly ridiculous, the young man Jesus Christ had to be sacrificed—to save you from overloading your stomach—or rather abusing your stomach—and from overindulging in sexual exercises. Remember, every crime, known or unknown, recognized or not recognized, every evil and every wickedness, every abomination or pollution or defilement, springs from these two sources. I am not taking diseases into consideration, such as David describes in Psalm xxxviii, for example.

To satisfy the wants of these organs, leads to greed, selfishness, fraud, forgery, deception, falsehood, corruption, etc. The pleasures resulting therefrom are accompanied by vanity, pride, pamperedness, envy,

jealousy, hate, discontent, etc. The indulgences are known as drunkenness, lust, lasciviousness, fornication, adultery, obscenity, debauchery, whoredom, luxury, revelry, and by many other terms. These form the theme of the prophets and the burden of the apostles. These are the sins, the vices, they have been trying to crush and wipe out with their theological absurdities for several thousand years. They have created all sorts of bugaboos to frighten fools, idiots, and stupid ignoramuses into discipline. They have created hell, purgatory, dark and deep pits, brimstone and fire. The gentleman devil, or Mr. Satan, presides over the lower regions, conducts their affairs, only to accommodate the spiritual fraternity, from the pope to the Rev. Sam Patch. But in order to be saved, to go to heaven—an imaginary abode in the atmosphere, a sort of ethereal paradise in the upper strata of the air that surrounds this globe, either with or without sunlight—in order to get one up there some clown of a priest will mumble off masses, a sort of ribald fustian composition that will raise your spirit or your soul right up into the pure upper strata of this terrestrial atmospheric crust. Of course if there are seven heavens you must pay accordingly. In case, however, you miss the aerial place, the heaven, and accidentally become one of the devil's subjects, it stands to reason that Satan requires an extra fee to release you from eternal punishment—which the good, pious priest puts into his pocket.

It is a pertinent question to ask our spiritual advisers, whether or not the Christian kindergarten makes a specialty of guarding and regulating, by the celestial medium of the Son of God, the Holy Ghost, the digestive apparatus and the organs of procreation. Because all the sins and vices originate with these. The devil, or Satan, holds his jubilee in the pleasures and extravagant indulgences of man and woman. The church has long since

been deprived of its political power and importance. The civil law regulates minor and major crimes, and provides punishment therefor. The only function left for the Christian church, the ecclesiastical kindergarten, is advisory, admonitory, accompanied with frivolous promises—Be good, you well-dressed ladies and gentlemen; pray to our shadows, kneel before yon figure on the cross, sprinkle yourselves with holy water, and contribute liberally toward our support and sustain our kindergarten, then we bless you and give you a pass to the heavenly regions. *Basta!* Only believe, have faith, never mind about understanding, common sense, and reason, then you surely will be saved, and have a white and clean gown fresh from the laundry, a pair of wings, a golden crown, and you can have your choice of either a trumpet or a harp, which you may either blow or touch, and may sit at the feet of an old man with a long white beard, on a golden chair, his feet resting on the clouds, surrounded by an innumerable host of angels and cherubim that will make music everlasting, where spiritual fountains will keep you cool, oh, and a vast deal more which can not be here recited. Anyone who desires a full and complete description of this celestial paradise, this heaven, including Abraham's bosom, the right hand of Jesus, his beloved Father, and the Holy Ghost in the bargain, may obtain it by making proper application. Ah! what a blessing it would be for the whole human family if the churches were utilized for educational purposes wherein truths, scientific truths, could be taught; where young people could meet to amuse themselves, or be instructed in something useful; where young men and women could entertain themselves by feeding off the tree of knowledge, instead of loafing round saloons, round the street corners, gambling-houses, dives or pool rooms. Young and old must have a pastime, and a place to pass this time; if the state or community does not provide such places in densely populated districts, where

are these poor, ignorant creatures to go to? Talk about charity! A large bulk of our charities are advertising schemes. I do not call what I here advocate a charity, but a right. If we want to improve the public morals, if we desire to educate the young men and women, provide district temples for amusement and instruction, open from 10 A.M. to 10 P.M., where they may assemble after working hours, sit, talk, read, or play—may educate the brain, the nervous and muscular tissues, so that both these master tissues may perform their functions skillfully, naturally, and judiciously.

Our scientific scholars throughout the world have long since dispensed with the supernatural. Know the natural, is the modern shibboleth. If you want to take care of the machine, understand the machinery, and if you want the coming generation to understand something about it, it is certain that the saloon is not the proper place for it.

We ought to guard our public institutions with jealous care. Our public non-sectarian schools are the places for our children. The public schools ought to be numerous enough to accommodate every citizen's children in the land. I think it bad grace for any foreigner to come here to give us advice upon that subject. Archbishop Satolli, papal ablegate, said at the recent meeting of the American archbishops in New York, on "The settling of the school question and the giving of religious education:" "To the Catholic church belong the duty and *divine right* of teaching all nations to believe the truth of the gospel, and to observe whatsoever Christ commanded.

"For the rest the provisions of the Council of Baltimore are yet in force, and in a general way will remain so, to wit: Not only out of our paternal love do we exhort Catholic parents, *but we command them*, by all the authority we possess, to procure a truly Christian and Catholic

education for the *beloved offspring given them of God*, born again in baptism unto Christ, and destined for heaven, to shield and secure them throughout childhood and youth from the dangers of a mere worldly education, and therefore to send them to parochial or other truly Catholic schools."

The beloved offspring given them of God? Nonsense! About as much born of God as a calf, or a flower. Offspring are the natural result of a natural cause. "Born again in baptism unto Christ, and destined for heaven"—would it not be well to ascertain what the Catholic church has ever done to elevate and educate the masses? Does not the educational system of Peter Dens, Satolli, and Co. consist merely of: 1. To hear mass on Sundays and all holy days of obligation; 2. To fast and abstain on the days commanded; 3. To receive worthily the blessed Eucharist at Easter, or within the time appointed; 4. To confess our sins at least once a year; 5. To contribute to the support of our pastor; 6. Not to solemnize marriage at the forbidden times, nor to marry persons within the forbidden degrees of kindom or otherwise prohibited by the church nor clandestinely? The dirt and filth, the nauseating nastiness, of the cesspool of the "Moral Theology" of Peter Dens cannot be printed in the English language. Or perhaps Mr. Satolli will educate the children to mumble over and over the litany of the blessed Virgin, quoted in another chapter, and all the rest of the instructions in mortal sin, venial sin, precepts of the church, infidels and heretics, decalogue, grace, justification, merit, virtue of faith, articles of faith, apostolic creed, church visibility, marks, holiness, authority, infallibility, concerning ecclesiastical councils, supreme pontiff, signs of the cross, magic, miracles, sacrament, worship of relics, worship of images, resurrection, heaven, hell, perdition, purgatory, etc., etc.

Satolli and his *confréres* would rather have parish schools,

to educate the young in their ecclesiastical stupidities, and draw the funds from the state treasury in order to sustain them. The Roman Catholic church, in its career as an educational medium, has not contributed one iota towards the progress and advancement of civilization. The opposition of its clergy has always been the severest and most bloody. Humanity "owes them no thanks for the culture and privileges it now enjoys. The church interferes and checks every step forward. The clergy are determined to keep the masses ignorant as long as it is possible. Greed, selfishness, rapacity, dominion, self-righteousness, and self-sanctification have ever been their chief characteristics. Every act and every transaction is justifiable so long as their ends and objects are gained. Satolli represents the pope's big toe, that is ready to be firmly planted on the neck of our public school system, whenever the power of state or nation is secured. The wily priests with their Jesuitic craftiness never lose an opportunity. In a republic they are republicans, in a monarchy they are monarchists. They are anything and everything—but the church with all its abominations first. All else must be subservient to their will, to their power, to their use. They are intolerant, bigoted, and tyrannical all the time. Whether it be to prevent the Methodists from establishing a church in Austria, or to intrude their priestly interference in the public school methods in Waterford, Saratoga, it is the same impudent aggression that has characterized them for ages. They are bound to keep the people ignorant, superstitious, and slaves to their system, in spite of all the existing civilizing influences. What we want, and what we must have, is a public school system of education free from all sectarian bias, with neither catechism nor Bible-reading, neither prayers nor psalm-singing, but a thorough instruction in all matters of a nature directly beneficial in the conduct of this life.

The state of transition is rapidly forcing itself upon the minds of men. They can no longer be held in submission. They believe no more in the antiquated notions of four thousand years ago—though modified and decorated to suit modern times. Notwithstanding the ecclesiastical hedges, fences, walls, and draw-bridges that have been erected by priests' sagacity and cunning in order to prevent encroachments on their theological fortifications, it is plain that there is a natural wearing and tearing of effete notions of the past. That the structure, erected on a false and fictitious foundation, has already given way, Protestants can testify. And as the Protestants have yielded to dissenters, etc., so must they all gradually crumble—before the battering-ram of scientific truth first, next before the advancing intelligence of the masses, and lastly before the press, which indiscriminately lays bare before the public every wrangle, every squabble, and every dissension occurring among the followers of Christ. Neither faith, grace, nor brotherly love, the holy kiss of Paul included, prevents these saintly gentlemen from exercising their greed, selfishness, and covetousness, as well as throwing dirt at one another. Father Corrigan vs. Cahenslyism and Wigger—they keep the pecuniary pot boiling. There is neither malice nor jealousy, but all is for the love of Christ. Dollars and cents? These pious brethren would scorn the idea. At Professor Smith's trial for heresy the ladies of Mount Auburn church presented the heretic with a basket of flowers. When in old times we find heretics tried by the Roman Catholic church, Are heretics rightly punished with death? asks the priest. St. Thomas answers in the affirmative. Latimer and Ridley were treated to an excellent bonfire at Oxford, 1555, for being heretics. Nor did Cranmer receive white and pink roses in a bed of fern leaves and smilax. What a change! Professors Smith and Briggs are proud to be heretics. They are praised and complimented for being heretics, and no doubt will be well

taken care of when these frivolous proceedings have terminated. Guilty or not guilty, they have gained notoriety enough to place them in an excellent position for the rest of their lives. I call that a high, very sensible, and very respectable sort of martyrdom. Both these gentlemen ought to be very grateful to science for having brought about such a change, that gives them the privilege of differing from their spiritual brethren and becoming respectable heretics with baskets of roses. O Civilization, how much have we to thank you for all this! It is so lovely to be a heretic, a blasphemer, and a martyr in this present generation! What a pity that Daniel's *Mene, mene, Tekel upharsin* is not quite applicable to the present condition of Christianity. The great ecclesiastical bugbear of Christianity, backed by their God, their Son, Holy Ghost, Virgin Mary, saints, popes, Heaven and Hell, and their infinite methods of salvation, is nothing near so terrible as he used to be. That bugbear has been tamed, and is, comparatively speaking, gentle. His appetites and his passions have been subdued. Indeed Paul deserves no small credit for polishing the Mosaic God. It is only occasionally that Paul mentions his God's wrath or severity, and very mildly too. Paul's God comes near being esthetic. The Mosaic God is muscular and energetic. Paul's God is mild and persuasive. The Mosaic God was a fighting god, conquering territory and molding a political nation. Paul's God has quite another line of business, sin-forgiving and soul-saving. The Mosaic God was all alone engaged in business. Paul's God is a firm—Father, Son, and Holy Ghost. The occupation of sin-forgiving and soul-saving is carried on with great ceremonials in our Christian kindergartens, accompanied with music, prayer, and psalm-singing. The sins are derived, directly or indirectly, from two organs in the main—to wit, digestive and sexual. Any man or woman that cannot perceive the truth of the above must be exceedingly obtuse. Does anyone believe

that the teachings and preachings, with all the complementary paraphernalia and other numerous accessories, are necessary to save us or guard us against transgressions or sin? Supposing all the churches and buildings assigned to the worship of God or gods, and all the priests and preachers, disappeared from the surface of this terrestrial globe, would this planet come to a standstill, or the sun cease to shine? Would the elements entering into the composition of the numerous substances found on or within this earth change their relative proportion, construction, or chemical relation? We need not have the slightest apprehension. New systems of ideas have always displaced and replaced the old systems. As we advance from cycle to cycle, this is continuously taking place. The hand gave way to the stick, the stick to the spade, the spade to the hand-plow, the hand-plow to oxen, oxen to horses, horses to steam, etc. It is the natural progress from one step to another, in every branch of thought, learning, and industry. It is a higher education and a better comprehension of the human machinery, a knowledge of the proper functions of the nervous and muscular tissues, a keener insight into the necessities of life, a regulation and control of the organs of organic life, a riper judgment, and a more evenly balanced brain power. The churches with their ethics and refined methods of the present day, with their eloquent admonitions constantly repeated, cannot be regarded in any other light than as a theological kindergarten for a fashionable musical Sunday entertainment.

# CHAPTER XXVI.

# RATIONAL REVIEW.

*Reason and Reflection.*

If any person with a, reasonable amount of intelligence will seriously reflect, he may gain sufficient information to satisfy himself as regards the true nature of the conditions that surround him.

*First* try to the best of your ability to present in your mind the outlines of this terrestrial globe, this planet on which we live, with its mountains and its valleys; oceans, seas, and rivers; the two extreme poles, north and south; the center of the earth's surface and the equator, etc. Next try to satisfy your mind that this planet has no immediate connection with any other planet—that it belongs to a system of planets that revolve round the sun, with a space or distance between them of many millions of miles. And

That this planet is entire and complete in itself.

Whatever substances are about, upon, or within the earth, belong to this planet and no other.

That not a particle of any substance can leave this earth,

whether visible or invisible.

That all formations, no matter of what character or nature, are made from substances belonging to this earth.

That the size and weight of this globe has never changed. It is the same now as it was millions of years ago, or will be at any time in the future.

That the quantity of water upon the surface of this earth, whether ocean, sea, lake, or river, has neither increased nor diminished.

That the solid mineral portion of the earth has neither increased nor diminished either in size or weight.

That the fluid, the watery portion, is susceptible to change of position and conditions on the surface of this earth, whether above the earth's surface or upon it.

That all clouds, rain, vapor, mist, moisture, dew, snow, hail, must be and is taken from the waters on the surface of the earth, and when clouds, that have been taken from the waters of the earth, fall to the surface of the earth in the form of rain, vapor, mist, moisture, dew, snow, or hail, they simply return what has been temporarily taken or loaned from the waters of the earth.

That in the case of all deluges, freshets, overflows, that have ever taken place, the waters that enter into their formation have been taken from the waters of the earth. The waters have simply changed position from one locality to another.

That all ice formations are nothing more than solidified water. Water crystallizes by the absence of sunlight, and melts in the presence of the sun's heat.

That snow is nothing more than congealed water, and returns to water when heated.

That the quantity of water remains the same. Whether it rains forty days and nights, or a whole year, it is neither increased nor diminished.

That the deepest portion of the earth's surface is filled with water. Being fluid, it naturally fills up the hollows until it has found its level. If there is more water than it can hold, it will find its way into the next hollow. And the higher portions of the earth's surface will not and cannot be covered by water. Such is the condition of the earth's surface that the deepest places on this terrestrial globe are filled with water; thus oceans, lakes, pools, and rivers are formed.

That all living substances, whether vegetable or animal, are composed more than two-thirds of water.

That more than two-thirds of the entire quantity of food taken daily into the animal economy consists of water. That is to say, we feed on more than two-thirds of water.

Nothing living can maintain its existence without two-thirds of water.

## *Second.*

All the material taken from the earth's surface, or from the interior of the earth's crust, for any purpose whatsoever, no matter how great the weight or volume may be, does not increase the weight of this earth, or diminish it. The

material has simply been moved from one place and deposited in another.

The building of one city, or ten thousand cities or more, would not add one pound more or less to the entire weight of this earth.

All the stone, coal, iron, copper, silver, gold, lead, and all other mineral substances, used either in building, machinery, or anything human ingenuity can make or invent—all belong to this earth. No matter how great the bulk or quantity, it does not influence this earth one particle.

Moreover, this earth would not be in the slightest inconvenienced in its motion or evolution whether there were sixteen billion of persons on its surface, or ten million times as many.

Nor would it make the slightest difference to this terrestrial globe whether the entire animal creation was destroyed, or increased indefinitely. It would neither slacken its pace, increase its weight, diminish its size, change its poles, alter its seasons, nor in any other way be affected.

The fluids, the solids, and the gases would relatively remain the same. Let it be distinctly understood, that whatever change may take place in some remote future, say one billion million of years, more or less, this earth as a whole will be but little affected. Vegetable and animal life may disappear, but the component parts of the earth cannot be destroyed or changed. Furthermore, whatever is produced upon this earth by the inventive power of man's faculties, in the arts and sciences mechanical, the natural, and what is thought to be supernatural, whatsoever shape or character it may take, whether phase or phenomenon, an idea, thought, or imagination—in fact, every thing, every

essence, from an angel to the devil, from a saint to a sinner, from a brass button to a god or gods, holy ghosts or divinities, all, all, are part and parcel of this earth. All there are recorded in any book, called sacred or profane, inspired or uninspired, visionary or materialistic, are the creations of the brain of man, inventions of the brain of man, concoctions and fabrications of the brain of man. Whether devil, saint, angel, or god, they are of earth, earthly, chained to this terrestrial globe so long as there is a brain in human form that can exercise its faculties.

*Third.*

No things can leave this earth, whether they are things visible, or things that are not visible.

Nothing can come to us from any distant planet, whether it is visible or not visible.

All things or beings, whether visible or not visible, tangible or not tangible, perceptible or imperceptible, belong to this earth, are the products of the earth.

All things, beings, forms, or shapes, whatever be their nature or consistence, however they have appeared or been produced, on any portion of the surface of this globe, are the products of this earth.

All things, beings, forms, shapes, material, or what appears to be material, are produced upon the surface of this earth.

All things, beings, forms, shapes, phases, or phenomena, and all manifestations, whether spiritual or supernatural,

are the products of this earth, produced through the material composing the nervous matter, by the ordinary physiological mechanism of the animal economy.

No psychological condition, as it is termed, can be produced without nervous matter. It is a function of nerve or brain material. It has no existence of itself. It is not a product foreign to matter.

The soul is a term employed to represent in the abstract an intellectual product of, or the result of functional activity of, brain substance. Where there is no brain there can be no soul. And souls differ in proportion to size, quality, quantity, educational or brutal development.

The mind is the collective term for the entire product of nervous activity, from non-intellectual to intellectual activity. Thus we have all kinds of minds—vulgar, brutal, licentious, pious, enlightened, educated, intellectual, refined, ideal, imaginary, etc., etc.

A mind may be simple, mixed, complex, complicated, perverted, disordered, rational or irrational, etc., etc. The mind is of ages—infantile, childish, youthful, young, mature, deliberate, strong, weak, and senile, feminine or masculine, etc., etc.

Nervous effects not understood are interpreted to be supernatural, not the product of the matter composing brain; this is false.

The so-called spiritual manifestations are, in plain terms, delusions for susceptible nervous conditions, and generally largely adulterated with fraud. Nervous conditions bordering on hallucinations may easily be influenced by a strong nervous force and utilized for swindling purposes. There is as little truth in spirit manifestations as there was

in the casting out of evil spirits or devils, as related in the Bible.

*Fourth.*

Material prosperity consists in the accumulation of wealth, gained either by industry or inheritance. Wealth is used:

1. To supply food sufficient in quantity to sustain bodily health.

2. To obtain clothing to protect the body from extreme heat, and also for decorative purposes.

3. To furnish domicile or housing to shelter the body against the inclemency of the weather, in luxury as our acquired taste may desire.

4. To give us the opportunities of an education and training that we could not otherwise obtain.

5. To provide for those that are dependent upon us for support, as children and old persons.

6. To exercise charitable acts, in aiding all those that are either disabled or unable to procure the necessities of life —clothing and shelter.

*Remember that* God has not created anything—either plant, animal, or man.

While we resemble each other, we are not precisely constructed all alike.

Dogs are dogs, for example, yet a Skye terrier is not so big as a Newfoundland dog, nor is either fashioned the same as a bulldog.

The same may be said of plants and trees. The structural tissue of all trees is wood, yet are the trees not all alike. Nor can the wood tissue of the various trees be used for the same purpose. Each one is useful in its own particular line or sphere.

The same may be said of minerals as to their appearance, qualities, uses, etc., etc.

Each individual is simply the offspring of his parents. God has had nothing whatever to do in shaping or fashioning him. He has not endowed him with anything. He has given him neither a soul nor a body. He is a creature that has been placed upon this earth by his parents, with all the qualities, form, general construction, composition, and constitution of his parents.

This hardly requires an explanation. Every farmer and cattle-breeder understands it. We have every day illustrations with our race-horses, cattle, etc. Two black persons cannot breed white children. They can mix them, yes. God had nothing at all to do with the selection of either the black man or white woman, or the white man or black woman.

Whatever seed is planted, that will grow, and no other. Cabbage seed will yield cabbages, and nothing else. That law holds good in nature—like will produce like; subject, however, to modification of soil, temperature, moisture, of the immediate surroundings. But it will not change the cabbage. It may be finer, of improved quality, larger—that's all.

The prevailing notion that we are all created free and equal, is nonsense.

1. We are not created. We are simply the offspring of our parents and inherit all the characteristics and qualities of our parents, which are subject to betterment, improvement, and a higher degree of culture, or deterioration, depending on circumstances and surroundings.

2. We are not born equal by any means, either in muscular strength, brain power, size, constitution, or wealth. Therein lies the difference in the condition and surroundings of man, while we are spending this short-lived existence on this earth.

3. Whether we are born free, depends upon what form of government we live under. We are free to comply with the laws of the government under which we are born, comply with the recognized moral and social laws in the midst of which our parents reside, where we first saw daylight.

Dismiss the silly notion from your mind that anything can help you, either priest or any supernatural agency. The priest may help as one man may help another.

Prayers can avail you nothing, nor blessings. Every man, to be a man, must act the man! Training, education, culture, makes him one. Free yourself from priestly influence and church dominion, if you would be free. Think and reason. Throw off the shackles of ecclesiastical slavery. Let your own brain work out your own salvation. Never mind the Jehova, the God of barbarism, the Christ of delusion, or the Holy Ghost of the imagination. Shake off the dust of superstition and ignorance if you would be free.

It is the noblest work of man to make himself free—to make himself equal, not muscular—free from prejudice,

free from superstitions, free from bigotry, free from ignorance, free from vice, free from passions, free from wrong-doing either to yourself or to your fellow-man. Equal you can be in brain power, brain culture, in brain force, by brain culture, education, in the improvement and perfection of the intellectual faculties, so that we may exercise our understanding and judgment, free and untrammeled, to the benefit of ourselves and to the benefit of our neighbors.

The perfection you imagine your God ought to be, exalt yourself to that perfection, and be an intelligent free man.

## CHAPTER XXVII.

# VISIONS—BIBLE DREAMS—REVELATIONS.

These are the fireworks of the imagination.

*Isaiah's* vision, chapter vi, 1, 2:

"I saw the Lord sitting upon a throne, high and lifted up, and his train filled the temple.

"Around it stood the seraphim; each one had six wings; with twain he covered his face, and with twain he covered his feet, and with twain he did fly," etc.

*Ezekiel*, chapter iii: Son of man eats the roll.

Vision of chapter viii: "A fire below the loins, and the appearance of brightness, as the color of amber upwards," etc.

Chapter ix: "Six men with slaughter weapons, clothed in white linen with a writer's inkhorn by the side."

Chapter x: "Above the head of the cherubim there appeared over them as it were a sapphire-stone, as the

appearance of the likeness of a throne." Verse 2: "Go in between the wheels even under the cherub, and fill thine hands with coals of fire," etc. Verse 4: "And the house was filled with a cloud," etc. Verse 8: "And there appeared in the cherubim the form of a man's hand under their wings." Verse 9: "Four wheels," etc. Verse 12: "And their whole body, and their backs, and their hands, and their wings, and their wheels were full of eyes round about, even the wheels that they four had." Verse 14: And every one had four faces, the first face was the face of a cherub, the second the face of a man, the third that of a lion, the fourth the face of an eagle, etc.

Chapter xxii: Sin.

Chapter xxiii: Whoredoms.

Chapter xxxviii: Boneyard.

Chapter xlvii: Visions of holy waters.

*Daniel's* visions, dreams:

Verse 3: Four great beasts came up from the sea. The first was a lion and had eagle's wings. The second was like a bear, it had three ribs in the mouth between the teeth, etc. The third was like a leopard, and had four wings of a fowl, and had four heads. The fourth a beast dreadful and terrible, strong exceedingly—had great iron teeth—and it had ten horns. A little horn came up; in this horn were eyes like the eyes of a man, a mouth speaking great things. Throne whereon an ancient sat, the hair of his head like pure wool, garments snow-white, etc.; throne of fiery flame, wheels as burning fire.

Verse 19: "Then I would know the truth of the fourth beast," etc. His teeth were iron, nails of brass, etc., etc.

Chapter viii: A ram had two horns; one was higher than the other. He saw the ram pushing westward, northward, southward, etc.

Verse 5: A he-goat with a horn between the eyes; the goat smote the ram, broke the two horns, etc.

*Zechariah* iv: A candlestick all of gold, a hood upon the top of it. Seven lamps thereon, seven pipes to the seven lamps; two olive trees.

Chapter v: Flying roll twenty cubits long, ten cubits broad.

Verse 9: Two women, and the wind was in their wings; they had wings like a stork.

Chapter vi: Four chariots between two mountains of brass. The first chariot had red horses, the second chariot had black horses, the third chariot had white horses, the fourth chariot had grizzled bay horses, etc.

The most prominent men in the Old Testament that were endowed with high imaginative powers, were not many. The most noted among them were Isaiah, 681 B.C.; Ezekiel, 591 B.C.; Daniel, 559 B.C.; Zechariah, 535 B.C. These four visionary gentlemen lived during a very exciting, troublesome period. It was the ending of national life. There were continuous wars, constant changes, invasions, robberies, plunder, and all other barbaric crimes that ordinarily accompany these revolutionary events. Israel was made captive 721 B.C.—the lost ten tribes, as they are called. The conquest of Jerusalem was 606 B.C.; the captivity of Judah and destruction of Jerusalem, 588 B.C.

It must be remembered that all the prophets, so termed, lived during a time of approaching national dissolution,

and date from the death of Jonah, 761 B.C., to the death of Nehemiah, 430. These political preachers, agitators, and fault-finders were altogether some twenty in number. And when national life ceased, these prophets ceased. Men of this particular type and character were no longer needed. They had outlived their usefulness. Their national greatness was rapidly disintegrating—short-lived it was. Luxury, licentiousness, and crime; rapacity, internal disorder, factional strife, lack of order and discipline, made them the prey of neighboring nations, that finally proved their destruction. It was not a question of God or Jehovah or idols; it was a question of organization, discipline, and a higher civilization, that wiped the Jews out as a nation. They struggled as long as they could maintain their existence as a nation. They were overpowered and subdued. It is not, therefore, surprising that these men appealed to their patriotism—their moral sense, of which they had but little—and made every endeavor to reform them. The national pride, love of country and patriotism, fired their imagination. They talked, wrote, and scolded in the name of the visionary God in fashion among them, employing the phraseology then in use, giving vent to their feelings, their passions, their lamentations, their dreams, their visions, the product of an over-excited nervous system, mixing poesy, philosophy, and facts indiscriminately; producing a heterogeneous, fantastic creation of the brain, part true, but false as a whole, dovetailed together as the fancy of the moment suggested. These rambling fireworks of the imagination have little meaning and less sense, except that they portray their feelings, emotions, and practical impressions for the time being. Eliminate the facts out of their writings, and you obtain a residue of wild, incoherent ravings of an over-excited, over-heated brain.

We hear nothing of any great mental disturbance or loss of

equilibrium, until we reach a new crisis. For nearly *four* hundred years not a vision, not an angel, not a prophet, is heard of.

The religious disputes, the ecclesiastical quarrels, the heated discussions, the hatred, hostility, and opposition that the differences of opinion engendered, caused considerable nervous irritation, mental excitement, and a display of the imagination. This new religion, this reformation, this new organization, produced no small amount of fermentation. It was all nervous, stimulated to a degree of exaltation, rising in intensity to enthusiasm and religious ecstacy, wherein many varieties of nervous phases were exhibited. St. John was on the isle of Patmos when he wrote his Revelations. He could not have chosen a more suitable spot for his visionary work. An isolated little island situated in the Archipelago near Asia Minor, it is one of the smallest islands in that region. It could certainly not contain many inhabitants. It is surrounded by sea and exceedingly lonely. A man with a highly nervous temperament could almost see anything in that dreamland of melancholy and seclusion. John's visions resembled those of his predecessors several hundred years previous. But John came four hundred years later, and had the advantage of more culture. Ideas had multiplied, experience had increased, the imagination was amplified. Education had advanced, and the mental faculties were better developed. He had therefore the brain, the opportunity, and a very favorable locality, to dream, to have visions, and to imagine to his heart's content. He had the material, the impressions, and the state of mind to aid him. Of course we take it for granted that John wrote these Revelations—or some one imagined these things for him.

John wrote to the seven churches, Ephesus, Smyrna, Pergamos, Thyatera, Sardis, Philadelphia, and Laodicea. None of these places was any considerable distance from

Patmos. What he sees:

Chapter i: Seven candlesticks. One was like (verse 13) the Son of Man, clothed in garments down to the feet, girt about the paps with a golden girdle. Verse 14: "His head and his hair were white like wool, as white as snow." Verse 15: His feet like unto fine brass, as if they burned in a furnace; and his voice as the sound of many waters. Verse 16: He had in his right hand seven stars, and out of his mouth a sharp two-edged sword: and his countenance was as the sun shineth in his strength.

The second and third chapters are advisory to the seven churches.

In the fourth his imagination takes a great flight.

A more romantic spot to have visions could not be found—about 38° north of the equator, a beautiful sky, mild climate, calm waters, and a solemnity of surroundings that would impress a less imaginative mind. It would have a marvelous effect on an excitable fanatic zealot, brimful with fantastic religious notions. No wonder he beheld the doors of heaven open, and heard a sound of a trumpet—and he was immediately in the spirit; that is, he was either dreaming or in an ecstatic state, and could see all the things he did see with his eyes either closed or open.

He saw a throne. One sat in it. It looked like jasper and sardonyx. And he saw a rainbow like emerald. Round about there were twenty-four seats, wherein twenty-four elders were sitting clad in white raiment, with crowns of gold on their heads. Thunder and lightning came out of the throne. There were seven lamps before the throne, and seven spirits of God, and before the throne there was a sea of glass like unto crystal; and in the midst of the throne and round about were four beasts, full of eyes before and

behind.

The first beast was like a lion, the second beast was like a calf, the third beast had the face of a man, the fourth beast was a flying eagle. And the four beasts had each six wings about him, and they were full of eyes within.

Chapter v, 6: There stood a lamb with seven horns, seven eyes, seven spirits, etc.

Chapter vi: He saw a white horse, a red horse, a black horse, and a pale horse. The first had a crown, the second a sword, the third a pair of balances, on the fourth sat Death and Hell. There were seals opened, etc., etc. The fifth seal was the souls slain by the sword of God. The sixth seal, earthquake, the sun became black and the moon red, and the heavens departed as a scroll, etc.

Chapter vii: He sees four angels standing on the four corners of the earth, holding the four winds of the earth, that the wind should not blow, etc. He saw another angel with a seal—for various tribes, etc.—very fanciful, very fantastic, very imaginative.

Chapter viii: The seventh seal opened. Seven angels with seven trumpets standing before God. One angel stood with a golden censer. Five filled the censer with fire. Voices. Thunderings, lightnings, and an earthquake.

Verse 7: The first angel sounded. There followed hail and fire, mingled with blood; trees and green grass were burnt up.

Verse 8: The second angel sounded. A mountain of burning fire was cast into the sea, and the third part of the sea became blood.

Verse 9: A third part of the creatures and a third part of the

ships were destroyed.

Verse 10: The third angel sounded. A great star fell from heaven, burning.

Verse 11: The fourth angel sounded. A third part of the sun and moon were smitten, a third part of the stars, etc.

Chapter ix: The fifth angel sounded. A star falls into the bottomless pit. He mixes smoke, locusts, scorpions, torments, horns, battles, crowns of gold.

Verse 7: Faces of men with hair of women and teeth of lions. He sees breastplates of iron. There is sound in the wings, sound in the chariots running to battle, etc., etc.

Verse 17: He sees the horses in the vision, and them that sat on them having breastplates of fire, and of jacinth and brimstone; and the heads of the horses were the heads of lions; and out of their mouths issued fire, and smoke, and brimstone.

Verse 19: For their power is in their mouths and their tails; and their tails were like unto serpents, etc.

Chapter x, 4: Seven thunders utter voices. John takes the little book out of the angel's hands, eats it up, and it is as sweet as honey but bitter in his belly.

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We pass on through the extravagances of the succeeding chapter to xvi. Seven angels and seven plagues and seven vials of wrath. The first vial of wrath was poured upon earth; the second vial of wrath was poured upon the sea; the third vial of wrath was poured upon rivers and fountains of water; the fourth angel poured his vial upon

the sun; the fifth angel poured his vial upon the seat of heat; the sixth angel poured his vial into the river Euphrates, and the waters were dried up, unclean spirits like frogs came out of the mouth of the dragon, etc. The seventh angel poured his vial into air—voices—thunder—lightning.

A more jumbled mass of hysterical nonsense was never concocted by the brain of man.

With this silly twaddle of an over-excited nervous system, he continues to give vent to absurd impulses and perverted impressions of a theoleptic nature.

In chapter xx he sees an angel from heaven having the keys of the bottomless pit and a great chain in his hand. And he laid hold of the dragon, that old serpent, which is the devil, and Satan, and bound him a thousand years. Verse 3: "And cast him into the bottomless pit, and shut him up," etc., etc. Verse 9: "And they went up on the breadth of the earth, and compassed the camp of the saints about, and the beloved city: and fire came down from God out of heaven and devoured them." Verse 10: "And the devil that deceived them was cast into the lake of fire and brimstone, where the beasts and the false prophets are, and shall be tormented day and night forever and ever," etc.

That this so-called revelation is not the product of a healthy brain is self-evident. That John was reveling in the realms of fantasie, while he was laboring under a theological nightmare, is so palpable, that he might almost be accused of being a monomaniac. And that this abominable concoction of absurdities should form the basis of a system of moral education, and be tolerated as a supernatural production, is an outrage on common sense. The whole construction is the fabric of a man bordering on a state of hallucination, where fancy, fact, and fiction are

indiscriminately mixed and compounded with the theoleptical effervescence of an almost demented enthusiast.

There is not a particle of sense in the entire twenty-two chapters, except such as refer to earthly particulars. The combination is false in conception, and pernicious in its tendencies. He sees and hears things so glaringly ridiculous that it is really surprising that any sensible preacher can regard the writings in the light of seriousness. It is perhaps as unique an erratic compilation of material substances as was ever produced, based on ignorance, superstition, and a diseased mind. That man, St. John the Divine, had no more conception of the size of this earth or its configuration than he had of electricity, or a steam-engine. Of course I understand that theologians do not—or pretend not to—look upon the statements literally. They may interpret the contents of Revelation from a spiritual point of view, nothing will or can relieve it of its defects. Whatever he meant by his ravings, in those days, they do not contain a particle of practical sense. When he beheld the doors of heaven open and heard a sound of a trumpet, he was immediately in the spirit. Then his mind spliced together thrones of jasper, emerald, seats, elders, white raiment, crowns of gold, seven lamps, seven spirits, a sea of glass, and four beasts full of eyes, a lion, calf, man, eagle, six wings, four horses, death and hell, seven angels, seven vials of wrath, hail, fire, blood, thunder, lightning, brimstone, a bottomless pit, etc., etc. Thoughts were flying through his brain that embraced pretty much all he knew, that he had either heard, read about, or had had some personal experience of, bringing all the things, objects, substances, and phenomena to bear upon his imagination, forming ideas to illustrate his heaven or hell, his saints and sinners, his salvation and his perdition. The mind was in a state of delirious confusion. John's mind had had a larger

experience, his imagination was more amplified and expanded, than the mind and imagination of his predecessors Isaiah, Ezekiel, Daniel, and Zechariah. The time and locality were not the same. The burden of John's thoughts was of a quite different nature. The nervous phenomena of theological excitement and irritation was purely visionary, while those of the Old Testament were largely tainted with the politics of their time. The former writers were loaded down with the expected ruin of their nationality; were filled with patriotism; were hoping and wishing for some one to come and help them out of their dire distress. Their ideas and thoughts led them to flights of imagination within the limits of their knowledge. John was fully charged with the philosophy and teachings of his times, and he mustered all his knowledge to open the gulf between the two extremes of bliss and punishment, the saved and lost. Thus he invented the appearance of heaven, with all the material substances, to exhibit its fearful glory, and showed the interior of his bottomless pit with its darkness, fire and brimstone. All these things might have appeared very terrible to the ignorant fishermen he had to deal with. It may still leave a strongly unpleasant impression on a great many of our ignorant population. Very few sensible people take any stock in John's incoherent, erratic flight of imagination. It may be regarded as a very curious composition of antiquity—senseless, useless, meaningless; admirable in its way, but nothing more than a production of an overwrought, unbalanced, over-stimulated, and over-exalted imagination.

We may distinctly perceive the progress that had been made in the evolution of the imagination, in the multiplication of ideas, in the amplification of thought, from Abraham to Moses, from Moses to David, from David to Isaiah, from Isaiah to John.

The nervous system, the brain, had undergone some

modifications among these people, but not of a nature that was likely to be a lasting benefit to humanity. On the contrary, these speculative ideas caused a great deal of friction of thought, bitter quarrels, hatred, crime, and bloodshed.

Neighboring nations, who had neither Jehova nor Christ, revealed to us the light of science that never produced a friction nor a quarrel—being based on eternal truth. From the very beginning of their conception to the present day this remains unchanged, unaltered and untouched, a monument of Truths, an inheritance for all future generations.

The God-Christ-Holy-Ghost idea has ever been a source of greed, selfishness, intolerance, bigotry, quarrel, hatred, licentiousness, cruelty, and crime. Bickering and quarreling are still going on. And the grasping hand of greed holds the ignorant bigot by the throat to squeeze the last cent out of him, to enrich and aggrandize the most pernicious organization humanity was ever plagued with. Heresy, blasphemy, is as fashionable to-day as it was in the rankest days of popery. Fortunately the civil law reigns supreme, otherwise these ecclesiastical monomaniacs would be at each other's throats. At this stage of scientific civilization, we can afford to look on at the theological quarrels and antics as a result of a nervous craze that is perfectly harmless.

After all it is but the physiological effect of an educational training, the development of the faculties and the evolution of the imagination; the brain functions in proportion to the progress made in the culture in general, harmonizing with the times, circumstances, and conditions of the period in which we live.

Every age has its turn in the evolution of the mental

faculties, and it must go through its stage. The visionary period, the result of a theological hallucination of an over-exalted imagination, can occur only under certain favorable conditions, viz., on the one hand a highly susceptible nervous temperament, a strongly biased educational training, and an enthusiastic excitability, and on the other, an ignorant, bigoted, poor, and helpless population.

# SHADES OF INTELLECTUAL DEVELOPMENT.

## FROM BARBARISM TO CIVILIZATION, MULTIPLICITY OF GODS TO NATURE, DARKNESS TO LIGHT.

Barbarism.
savagery.
ignorance.
idolatry.
Mammon.
GODS.
PHYSICAL
GOD.
Very
little
light.

Barbarians.
Women

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Physiology, science, mathematics, mythology, women honored science breaking. Greece a nation. | 1921–500 B.C. | Ignorance, superstition, Ugliness (to our notions) Caste rules. | Buddhism, Confucianism. Brahmanism, Philosophy, 320,000,000 gods. | 320,000,000. 20,000,000. 320,000,000 | Still degraded. | Tyrants. | Still ignorance, intolerance, non-progression, superstition, bigotry. |
| ONE GOD. Polygamy. | MOSES, 1500 B.C. | Mohammedanism, 175,000,000. | A.D. 600. | 175,000,000. | | | |
| FIVE GODS. Father, Son, and Holy Ghost, Virgin, saints, relics, etc. Idolatry, figure-painting, | ROME, 1000 B.C.–A.D. 325. | Christianity, 200,000,000. | A.D. 800. | 200,000,000. | | | |

Dark Ages. A.D. 325 to 1517.

THREE GODS. Protestantism A.D. 1517. Last A.D. 1693. Calvin 200. Progressive, A.D. 1700. Women tolerated, A.D. 1770. subordinate, A.D. 1800. suppressed, A.D. 1830. bigotry, A.D. 1730. civilization, Baptists, Methodism, Wesley. sects, Presbyterianism. schools, greed.

ONE GOD. Universalism. A.D. 1691. Unitarianism. Enlightened, Religious advancing. Culture.

DOUBTFUL GOD. Latest theological metamorphosis. A.D. 1550. A.D. 1870.

NO GOD. Science, nature, fact, truth. Manhood, womanhood. Intellectual development.

In modern times, if a man should attempt to rave after the style of John, he would certainly be declared a fit candidate for an insane asylum.

What was possible on the Isle of Patmos by John would be an utter impossibility to-day. It is not because we have not religious fanatics enough, but education, reason, and

science have advanced, so that such extravagant fire-works of the imagination would be declared evidence of an insane condition of the mind.

On the following page a diagram of various shading shows the growth of intelligence and enlightenment of the various religious denominations, indicating the beginning of actual progress with the Reformation, and how little there is left of the entire religious fabric that has been handed down these many centuries.

The darkness of ignorance is still hiding the truth. The church is doing its utmost to train the young in the pernicious doctrine of superstition and falsehood of antiquity. The clergy would stop our public school system, if they could drag humanity back into the mire of brutality.

The sooner the Bible, with its God, Jehova, Jesus Christ, the Holy Ghost, the prophets and the apostles, with all the angels, heaven, and hell, are placed under a glass case to be viewed and admired as a matter of antique curiosity the better.

## CHAPTER XXVIII.

# THE PLANETARY GODS.

*The Terrestrial God.*

Why man should claim that the terrestrial God, the God that was created on this earth, extends his sway beyond the limits of this globe, is not easily accounted for. It is an assumption that is not at all warranted.

We know that the composition of the planets that belong to the family of the solar system are the same as that of our own, this earth. All those worlds seem to be constructed of the same chemical elementary substances as this globe of ours, and working on the same general universal plan. That all the planets of the solar system, and the sun itself, possess the same common characteristics as this earth, is evident. The planets all move in the same direction round the sun. They all revolve upon their own axes, and round the sun. They have day and night, seasons and periods of revolution. They have their atmospheres, snows, rings, and all the necessary equipments of a planet proper. They seem to have seas, mountains, valleys, poles, equators, etc.

Some of the planets seem to be in a much higher state of organization than our own.

Take Saturn, for example, with its series of rings and satellites, its immense distance from the sun, 886,000,000 miles, moving at the rate of 22,000 miles per hour, and having a year equal to about 30 years of our globe. He flourishes at a distance from us of about 300,000,000 miles. He has a diameter of 73,000 miles. His volume is 700 times that of the earth, and he receives his light from the sun, just the same as we do. It is admitted by astronomers that the Saturnal scenery is most magnificent, and surpasses anything we are familiar with. The rings form immense arches, which span the sky and shed a soft radiance around; while in the strange beauty of the night eight moons in all their different phases, full, new crescent, or gibbous, light up the starry vault.

We know that the planets are composed of the same elementary substances as this world whereon we live, that they are also surrounded with an atmosphere, have water upon them, receive the sun's heat, exhibit all the peculiar characteristics of this globe of ours, and all the planets seem to be obeying the same general universal laws.

Can anyone give us a plausible reason why there is no organized vital matter on our neighboring planets—plants, living creatures, similar to those found on this terrestrial globe?

If the elementary substances are the same as those that are found on this earth, and they have a similar sunshine, heat, moisture, and temperature, all the forces may be presumed to be the same or similar. There is no reason that the elements should not enter into organic life of a similar, perhaps either inferior or superior, organization to that existing on this world? What is to hinder them? It is certainly possible, therefore probable. May we not assume that it is both possible and probable? Those on earth who believe that this globe of ours was especially fitted up for

us, made for man only, are very presumptuous. There was no special forethought for the adaptation or convenience of creatures like ourselves.

As to the forethought, adaptation, or convenience, the hog, the elephant, the ass, and the fly enjoy their life just as much as men do. It is very convenient for them. But not more so than it is for man, and it is no more convenient for man than it is for the animals. We are certainly nearer the truth to say that the other planets are inhabited by beings, races, that may exhibit as much intelligence as, if not more than, we do on this globe. The conditions of light and heat may not be the same. The other planets may vary in form and structure, and have shapes not at all familiar to us. That, however, does not in any way interfere with the reasonable probability, nay, certainty, that they are inhabited.

Whether they are inhabited or not, matters little. Yet we may safely make the inference that these planets are not simply placed in space for our convenience. May not the inhabitants of Venus, Mercury, Mars, Flora, Mnemosene, Jupiter, Saturn, Uranus, Neptune, etc., think that this earth has been created by their respective gods for their convenience? Have they not as much right to have each of them a god as this earth is supposed to have? Has not the god of Jupiter as much right to be proclaimed by a portion of its inhabitants to be the creator of all the planets, sun, moon, and stars, as this sectarian, terrestrial God has?

The right to this power, to this prerogative, is as much vested in the god of Neptune or Saturn, as in this earthly God. Imagine the god of Saturn complacently smiling at the arrogance of this pigmy of a terrestrial god. May not the god of Venus have a preëmptory claim to the godship of this planetary system? Or the god of Uranus, or of any other of the planets? Or possibly every planet has its god

that acts as superintendent over his own territory, the laws of gravitation preventing his divinity from leaving his place of abode. Or, perhaps there are no planetary gods—every solar system may have, perhaps, only one god, residing on the great sun himself, communicating directly with all his subject planets by the rays he sends forth. It is not at all unlikely that perhaps every solar system has its god. And over these many solar system gods, somewhere in the immensity of space, a god of immense magnitude may preside. So you may go on multiplying gods, sub-gods and superior gods, without end.

Where do we find that a man, or a set of men, have a right to arrogate to themselves the power or privilege to assume that this terrestrial God has anything at all to say or to dictate on any other planet? This earthly God has no more right to interfere with the business of Mars or Mercury than the god of Saturn has a right to interfere with our earthly affairs.

Should it, however, transpire that any planetary god, whether he comes from Uranus, or Neptune, or any other planet, should interfere, we who were made in his image will assemble in the houses we have built for his sake, for the terrestrial God's sake, and pass resolutions advising our terrestrial God to say to the other planetary gods: "Hands off, ye gods, if you please! For the sake of peace and harmony among the gods of this planetary system, we, representing this terrestrial God by proxy—since it really makes no great difference in the end of the great gathering-in of the elementary substances all organic beings are composed of—we, the organized elements of this earth, men, animals, plants, etc., more especially the highest organized beings, men, having a more perfected nervous system, being the elect of all terrestrial productions, claim the right to speak for our God, and proclaim to all planetary gods, potentates, majesties, holies of holies, or

their representatives, that they have no right whatsoever to interfere with our terrestrial management. We can have our little local pet God or Gods if we desire, so long as our methods do not in any way inconvenience them."

Let it be taken for granted that the same, elementary substances are found (of which we have evidence) in the sun and all the planets, and probably in the stars we see; that their gaseous fluids and solid substances are of similar nature to the elements known to us; and that they also receive the same sun's heat (or the distant stars may receive light and heat from some other suns), is it not more than likely that the conditions produced by the contact of these elements with the sun's heat, may resemble those we are familiar with? If there is heat there must be motion, there must be friction, there must be consumption and expenditure of heat, also expansion and contraction. If these forces exist, other forces necessarily must also exist, as cold from absence of heat, dynamic force, electric and magnetic forces. We may readily suppose that there are currents of air. Water may be agitated by the wind. If atmospheres surround these planets there is only one source of heat that can keep them in a gaseous state, and that is the sun. Heat from the same source keeps the Oxygen and the Hydrogen fluid. If evaporation and consolidation exist why should there not be aqueous vapor, rain, etc.? We must concede that the elements known as Oxygen, Hydrogen, Nitrogen, and Carbon are found in these distant planets. We cannot be far wrong in supposing that there are carbonic acid, ammonia, and maybe other combinations. Atoms certainly must exist, and molecules (a drop of water is a molecule). There may also be conductions of heat, of molecular motion. What then is to hinder the evolution of phenomena on these distant planets being regulated by laws very similar to the laws of this earth—radiation and absorption of heat, combustion and

explosion, tension and velocity of the various elements, under peculiar circumstances favoring all these conditions? That elements wherever found possess the same physical properties when brought under the same influence of heat and moisture, there can be no doubt, whether they are farther removed, or nearer to the contact of the sun's rays. It is a fact, a well-established fact, that different substances require varying degrees of temperature to reduce them to a liquid, gaseous, or solid condition, and no matter where the temperature is produced the result will be the same. If, for example, a temperature can be procured on the surface of Uranus, or Saturn, sufficient to melt iron, lead, or silver, these metallic substances will melt at Uranus or Saturn as quickly as on the earth's surface. The laws regulating radiation, absorption, dispersion, or contraction, or any other phase the elementary substances may assume, under heat or pressure, etc.—these laws will hold good on any of the planets just as well as on this terrestrial planet.

It is therefore far from unreasonable to presume that the organizable elements may have assumed a vitality on the distant planets, evolved and developed creatures in accordance with known laws, or laws that are still unknown to us. Because it is perfectly natural for these substances to organize themselves into life, under a certain degree of temperature, moisture, and electricity, when these necessary elements are present—as natural as that oxygen and hydrogen make water, or that the sun's heat sets all the elementary substances into a state of activity.

We have no reason to doubt that these planets, or even the sun, have not their own vital products just as well as this earth. These vital products may be of low grade, or of a very highly organized nature. We may assume, without fear of any great error, that wherever there are air and water there is life. Because if there is heat it is a sun's heat, otherwise there could not be air and water. If there is a

sun's heat, atmosphere, and water, there is certainly life, lowly or highly developed.

The degree of organic development depends on the age of the planet—whether it has been in existence a few millions of years more or a few millions of years loss. These organic forms may have advanced to any degree of perfection and possess qualities like or unlike our own, or they may still exist in a very primitive state of evolution.

Let it be distinctly understood that on the degree of organic development depends whether they have reached our height of perfection of nervous development, or the development of a substance capable of performing functions similar to the brain substance animals are endowed with on this earth, with physiological action the same or similar—whether undergoing gradual changes, and accumulating experience, they may have arrived at that degree of perfection to be capable of thinking and reflecting, may have acquired understanding of a nature possessing all the fear, wonder, and ignorance of certain states of nervous development, where the ideas are just forming and imagination barely assuming form. They may, I say, have begun evolving their gods, or images representing the same, or may have reached that state of perfection that every creature is endowed with such powers, understanding, and reasoning, acquired by millions of years of training and education, that they constitute gods in themselves.

Or the creatures inhabiting these planets may be in a condition like that of creatures many, many ages past upon earth—may have no knowledge of gods or God, but are undergoing the necessary evolutionary changes that will ultimately bring them to that happy elysium, when they will be capable to produce their God or gods, as we have done on this earth.

Why is it not possible that a higher order of beings inhabiting Saturn are at this moment employing instruments in order to ascertain the constitution and condition of this terrestrial globe, speculating on the probability whether this earth is inhabited or not? They may have positive knowledge that this planet has an atmosphere several hundred miles in depth. They may know its size, diameter, its distance from the sun, and that this planet revolves in an ellipse as the planet Saturn does. They may also know that the elements are of the same nature; and that there are mountains, seas, an equator, a north and a south pole, but only one moon. Looking at this planet as a star of this solar system, of perhaps the third or the fourth magnitude, nothing compared with their own, either in size, moons, belts, or other important features, these higher organized beings on Saturn may be able to behold worlds beyond themselves far more vast than their own, and regard this planet, Venus, Mercury, etc., as very insignificant affairs.

Why may they not have appliances, modes of travel or communication, as far removed in intelligence from our highest order of beings, as the difference between a frog and the pope?

We have no reason to exclude any supposition, however wild and extravagant, as to the conditions of other planets. It is not entirely imaginary. Inferences may be drawn from what we know, and deductions made from our practical experience. This problem is safer to speculate on, having a solid basis to start with. Those who believe in the actuality of an existing God have not a thing to base his existence on, except the natural functions of the brain.

But if we concede that this earth has a God, what right have we to assume that each other planet has not a god of its own? We have no evidence to the contrary. Who dares

to state positively that they have not a god? Why should this insignificant terrestrial planet God presume, or persons for him, that he controls and governs planetary bodies hundreds of times larger, and perhaps far more important, than this small solar system?

How do we know that the inhabitants of other planets have not had angels, saints, and saviors? How do we know that they have not had beings who pretended to know all about their god, and were as brutal, as savage, and as demented as some of the persons figuring in scripture, or the tyrannical, bloody papists of the Dark Ages?

The imagination of man supplied us with Gods or a God on earth; the imagination is justified in supplying other planets with a god or gods. The god of Jupiter, Mars, or Saturn, etc., may with as much force and propriety say, "I am that I am; I am the great I am, the creator of all things. You, Planet Earth, may be a little older, riper, more solidified, have a solid crust, yet remember our god is just as good as yours, and better. You have only one moon—a fossil world, a mere cinder. And, moreover, our god is fourteen hundred times larger than yours, because our globe is that much larger. Our globe has a diameter of ninety thousand miles. And we have four satellites, or moons. Our largest is as big as your whole earth. Therefore, it is ridiculous for you to claim superiority. As to my neighbor Saturn, with his eight moons and belts, his god smiles at your presumption. I, the god of Jupiter, agree with the great god of Saturn and others, that your terrestrial affected greatness is too ridiculous to be worthy of our serious consideration. In fact, it is absurd for your earthly godship to claim to have made the sun that great luminary that gives us all heat, light, and life."

Let us go but one step farther into space to show the fallacy of the assumption that this terrestrial God created

all planets, stars, etc. At the present time it is considered that the star Alpha (α) Centauri in the southern hemisphere is the nearest to the earth. Its distance is more than 200,000 times that of the earth from the sun, or twenty trillions of miles. Light would require about four and a half years to travel this enormous distance. The stars which we see at such immense distances are suns. The vast distance at which the stars are known to be, precludes the thought of their shining, like the planets or the moon, by reflecting back the light of our sun. They must be self-luminous, and are doubtless each a center of a system of planets and satellites.

Our sun is but a star. As we see only the suns of these distant systems, so their inhabitants see only the sun of our system, and that as a small star.

Arrogant, conceited humanity, with an unbounded assurance and self-confidence, mixed with profound ignorance, have the impudence to claim that their terrestrial God created all the stars, suns, and planetary systems that are so far away in space that the eye of man cannot behold them—no, not even with the strongest instrument yet made.

We may be compared to maggots on a big cheese, crawling over its surface; they may with equal propriety claim that their cheese is the only cheese ever created, and that it was made for their own special use, and that all other cheeses were made only for their benefit. Some of the maggots might equally claim that there was only one God—the man who made the cheese. That is, that man, the maggot's god, made the cow that gave the milk that produced the cheese whereon the maggot dwelt.

Let every planet have its God,
    And every God its planet.

Much mystery lies in the word,
You simply have to scan it.
Let every man his own God make,
God in man, pure and elect,
Let common sense and reason wake!
Knowledge, truth, makes man perfect.
Go search your God through depths of space
On suns and stars infinite.
The mind expands to every place.
To distance without limit.
If you don't find the God you seek
Search within yourselves. Perchance,
You'll find your God, quite good and meek,
But not in your ignorance.

## CHAPTER XXIX.

# EVERY MAN HIS OWN GOD.

Writers and thinkers with a strong theological bias, seem to fear that the world would go to pieces if the scriptural God or Gods were deposed. They seem to apprehend that the moral and political economy would seriously suffer, and the moral idea especially be destroyed.

When these gentlemen find it impossible to reconcile the difficulties that overshadow the personal and triple-headed deities—that somehow they cannot make them harmonize with the recent discoveries and the development in natural sciences—they attempt to mold them so as to fit the requirements of the occasion.

Thus, it was discovered that the *prime essence* of the world is God, or something that pervades all nature; that he is the first *great cause*, and that this implies some huge mountain of will power, and an immense ocean of intelligence; that he is *the creator of all things*—that out of him this world emerged and out of the world all the various activities and objects were developed by the life inherent in the substances, etc.

Then again they represent him as a *great designer*—

declare that God designed all things and beings, and put everything in shipshape order; and after the design was finished he set the machinery in motion.

These, and interminable similar pet theories and excuses, are made for God to retain a foothold in the mind of man. Clever brains and prolific imaginations have succeeded in clothing God, or Gods, with all the attributes thus far discovered either in man, beast, planet, or space—extension, contraction, elasticity, etc.—modes, limitation, finite, infinite, absolute—everything, in fact, that has ever been printed in the largest encyclopedia known.

These gentlemen should have had memories that the original doubts in Abraham's mind were the result of common sense and reason; that he still retained the sensual qualities of the Chaldean gods. The modifications and transitions of that first idea are very marked, as well as very numerous. By the time we reach Christ, he is not the same. It is to be regretted that we have no compliments to waste on this God—alias Jehova—because a more bloody, selfish, monstrous idea cannot be well portrayed, if the story in the Bible be true.

And certainly he, and his triple alliance, does not exhibit one redeeming quality during the centuries of Christianity, because a more hideous, outrageous, criminal monster cannot be constructed, except by human ingenuity and by human devices.

In another chapter we call the attention of the reader to some of the most barbarous abominations of the Roman Catholic church, and such a polluted set of butchering popes as words fail to give any adequate idea of.

All this goes to show that this imaginary idea of God may be made to fit any person or any purpose.

It is but reasonable to inquire, Does God create the Brain, or does the Brain create God? That is really the entire question in a nutshell.

We know, with absolute certainty, that God does not make brain, otherwise we should have it perhaps a little more uniform, and of a better quality. Besides, all other animals possessing brain would, of course, be entitled to the knowledge of this God in proportion to the size, quantity, and quality of the brain.

This, then, being impossible, we have no other means of arriving at the truth than by concluding that Brain created God. Every brain cannot create God; the great nervous centers may be insufficient, either in quantity or quality, to enable the brain to acquire qualifications that will give expression to more than the instinctive number of sensations and emotions.

Creatures generally are limited to the instinctive number of sensations and emotions; and act, move, and have their being in harmony with these. Animals of all classes belong to this category, and not infrequently man, too. By that is meant, man in an uncultured state, and even among them the degree of experience and the power of observation make the difference between one set of savages and another.

Intelligence, understanding, and reasoning power depend on some kind of experience. The repetition of experience constitutes, in some measure, the training of the senses, and through the senses and the cerebral hemispheres the intellect is thus formed and mind developed.

The intellectual acquirements may be limited by the ascendency of some predominating ideas or opinions that check progress. As for example, the absence of schools in

communities, the forcible prevention of education, the prohibition of education by priestly authority of the church, and the suppression by ecclesiastics of all ideas except their own.

This we may term limitation of brain culture by undue interference of the ascendent idea or ideas that limits the range of intelligence and subjects the will power to the control and direction of what the people presumed to be a greater right than their own.

Prescribed limits of education check or stunt the natural progress, and if any progress is made, the people must break through the prescribed limits, as was the case with Luther, Spinoza, Voltaire, Renan, etc.

The ascendency of man over animals checks their further progress in the way of intelligence. The superior hostile intelligence holds possession and will not permit further development. As regards animals, we have taken possession of the earth, and have put a stop to all further advancement.

Supposing a man develops an idea, it is not an easy matter to persuade his next-door neighbor, who is his equal perhaps in intelligence; but, it is not difficult to inculcate his pet idea into his child. It is, as it were, virgin ground, and he plows it to his liking. He has complete control. He is master. He directs it as he wishes, and prevents others from planting strange ideas or ideas hostile or antagonistic to his own.

In this manner we commence breeding ideas, and we continue breeding the same ideas, on the same principle as breeding pigeons or chickens; they are all of the same kind, if you don't cross them; and the more eggs you lay the more chickens you get, and if they multiply rapidly,

especially if you have many hens to one rooster (as the Jews had), what a multitude to spoil a garden-patch!

That is precisely what happens, and that is what actually took place with Abraham.

We have also a natural limitation to brain culture. We may instance the orang-outang, the Bushman, the negro, the idiot, etc.—brains that are not susceptible to much culture or education. The understanding, the development of the intellectual faculties, is limited of necessity. There is no possibility of going beyond their capacity; it will hold a given measure and no more.

Even among these, the range of intelligence may vary some degrees.

Impairment, effectiveness, or entire absence of any one of the senses, limits intellectual acquirements. The uniform activity of all the senses is thereby hindered.

We have in addition innumerable varieties of brain in size, quality, quantity, form; as also inherited failings or diseased conditions.

The qualities of God depend upon the qualities of the man. There has not yet been a god conceived by the human mind but greediness was the chief element. Men made gods for others, whose inferior intellect was easily swayed to believe in great benefits they were to expect, but never got, yet were continually paying for.

Every man or woman is responsible for his or her acts, and no God—supposing there to be any—can save him or her. There can be no intercession between man, and nature or nature's laws. Every living being is held to strict accountability to the prevailing forces and the controlling

elements that compose it. It is always a question of unchangeable equilibrium between the elements and the surrounding medium, as to the kind of a God we may acquire.

A man can see no farther than his sight will permit him. The organ of sight, the eye, may be so constituted that we can barely recognize the nearest object, or we may without difficulty distinguish the smallest object at a great distance. This condition, of seeing objects near, at a moderate distance, or far off, or not seeing at all, depends on the natural construction of the organ itself. The difference between the various qualities of sight is due to the proper qualities and shape of the various structures that enter into the composition of the organ of vision. Every part must be perfect—the lens, the iris, the cornea, the vitreous humor, etc. Not only must the parts be perfect, but they must also be in a healthy condition, to produce accurate vision. All this answers well for ordinary purposes in life, taking in such impressions as the apparatus of vision may from time to time receive. These are retained, stored up; thus memory of objects, the impressions of which have been recorded, may be recalled to mind either in actuality or in imagination. The education of that organ consists in the number, variety, and kind of impressions received. This constitutes the degree of educational experience, being regulated by the amount of knowledge of the greater or lesser number of objects that have been recorded through the retina on the great central nervous system.

Experience, long practice, matures and perfects the knowledge of all things that meet the eye; understanding becomes more thorough, intellect clearer, and judgment more accurate, enabling us by that means to recognize the smallest imperfection, the slightest deviation, and the most delicate shade of harmony, in color and form.

We all know how hard it is for a child to recognize shapes, objects, colors, etc. We know its long and tedious repetitions of looking at one and the same thing an infinite number of times before it will recognize it. We know that a child will repeat things, or the names of things, without knowing anything about them; or, it may know the names of things yet not recognize the things when presented to its sight. The decision or judgment whether the thing is right and proper, is left to the person who has already had experience and acquired knowledge and understanding concerning these matters. Thus the child may be directed rightly or wrongly, and its education must depend on the accuracy of the instruction received. However, the impressions received in the early part of life remain firm, and are not easily removed or eradicated, no matter how faulty, wrong, how perverse and false, they may be. The stronger and deeper the impressions and the longer they have become habituated to them, the harder it is to correct them, the more difficult to explain the errors. It is in such cases almost impossible to convince, and a tedious task to eradicate. By these early educational processes durable habits are acquired, that become persistent and remain during life; especially when no contrary influences have been brought to bear upon them to modify or correct them. It is almost an impossibility to train or educate the organ, whether sense of sight or ear, or the organ of voice, after a certain ago has been reached. An artist must start young in his artistic education if he has any desire to excel in that art —that is, if the organs of sight and touch are to be evenly balanced. So that whenever any person inherits the necessary qualities of sight and touch, and these become educated, I mean accurately trained, skill must result in excellence, and from that reach to a degree of perfection. The high art of painting becomes this man’s ideal, and this ideal his god, if the education of the other senses has not materially interfered in shading his ideal, or the moral and

social qualities, giving his productions a tone or tint that may cloud or brighten his efforts, not forgetting the inherent or acquired bias of other surroundings that may influence his mind.

In the culture of music or of the ear, there is a wonderful difference in the kind of sounds a person has received as his earliest impressions, the number of sounds his scale of the notes consists of. What we term the monotonous sounds of Chinese music delight the Chinaman's ear, and he cannot conceive how it is possible for Europeans to tolerate the immense amount of confusion that is usually displayed in an orchestra. Yet the European is delighted with our music and finds the Chinese music very dull. The same difference, but not to that degree, exists among the various European nationalities. Sprightly France thinks British music very dull, etc.

Painting is an art, but everybody cannot paint, though everybody has sight and touch. That art requires a great deal of training. The vast majority of mankind are not able even to draw an accurate outline of any object. Sight, the organ of vision, is a difficult organ to educate.

The same difficulties confront us with other organs. A degree of perfection is requisite in the construction of the organ in order to confer the necessary qualification for a higher training. And here too the education consists of receiving impressions through the organ of hearing to the brain, and these, like the impressions of sight, are recorded, that is to say, they are retained, in memory, so that we may recall them, or recognize them, when familiar sounds strike the ear. Any kind of simple sound is easily retained. A child will much more easily recognize the voice of a cat or a dog than a painting or a picture, and will remember the one but not recognize the other. There is certainly a difference in the educational capabilities of

these organs. Simple sounds are easily retained and easily reproduced. A simple combination of sounds are also retained without difficulty. Thus it comes that we are all more or less imitators of sounds or simple melodies. These seem to contribute to our amusement more readily, either for our own satisfaction, or for the satisfaction of others, or both.

These reproductions of sounds or melodies do not require any mental effort or physical effort. The organ of voice may be used—that is, we attempt to sing. We may hum, or we can pucker our lips together and whistle. Each individual whistles in his own peculiar fashion, seldom two alike. They may be similar, but never alike. The fault may lie in the lips, the tongue, in the form of the opening made, the manner of blowing through the opening formed by the lips, the duration and strength of the expiration, dryness or moisture of the mouth, the thickness or flabbiness of cheeks, etc., etc. Hence it comes that every man has his whistle. You may take a class and train them to whistle a melody, say “Yankee Doodle.” Each one will produce similar successive sounds or notes, so that that particular melody is recognized, but each one will have his own “Yankee Doodle,” with peculiarities, characteristics peculiarly his own. If, for example, he is musically inclined, or has had any training in music, he or she may put a quaver or two in, as a variation, more or less. Yet each one will still own his own whistle and pipe his own “Yankee Doodle.”

That is just what happens with God. We have no God, we never had one, but we have been educated up to one. In childhood we already hear the first indistinct sound, and we don’t know whether it is the bark of a dog or the mew of a cat. By and by, as we grow older and are ready to attend Sunday-school, or some other institution where these instructions are imparted, you learn the melody of

"Yankee Doodle"—rather puzzling at first, but it comes. Variations are put in to suit special cases and special occasions, and each individual member of any one class whistles his "Yankee Doodle" to the best of his ability—entirely his own; he is perfectly happy with it; it does not in any way interfere in the ordinary pursuits in life, his pleasures, his stomach, his diversion nor his business; and really it makes no difference where he is, in the street, in the factory, in the store, on the exchange, in the hovel or in the palace, he carries his "Yankee Doodle" with him. Whistle it over a birth, over a wedding, or over a funeral, whistle it wherever you will, it is the same "Yankee Doodle." It is used on all occasions—in wars on the battlefield, or at peace on parade, etc. Thus it happens that everyone, male or female, has his or her own peculiar "Doodle." If the man or woman or child had never heard this melody they would certainly not have known anything about it, and therefore could not have enjoyed that particular melody. He or she might have heard another melody just as simple, perhaps just as stupid, but differently constructed.

The culture of these theological ideas forms the fundamental groundwork of our educational church system, and each sect has its own method of planting its seed according to its peculiar notions. We must always bear in mind that before nerve tissue was developed, nerve force or thought could not exist; that the phenomena of imagination, or the product of a combination of ideas, the result of the impressions received by the senses, retained, and passing, connectedly or disconnectedly, through the brain, could not be effected except by experience and training.

The idea of a God or Gods impressed early in life, while the brain is being developed—the brain tissue of course—remains firmly rooted, and is very difficult to change or

eradicate later in life. In case a change is ever produced, it takes place by a process of reasoning, when understanding has been acquired. The acceptance of an idea or an opinion requires little sense and no reasoning, and, indeed, no education. Children believe anything they are told, until they grow older and learn to know better. Men and women believe because they don't know better. Accidentally they were placed in a particular groove of thinking, wherein they can glide forward, backward, round in a circle, perpetually, with ease and without interruption, without effort and without understanding. This perpetual gliding motion, within circumscribed limits, is over the same God, Holy Ghost, Christ, sin and salvation, or the reverse; no advancement or progress. Whatever has been accomplished in the affairs of men, has been done without the prescribed limits, and to that we owe our present civilization and material prosperity.

Whoever the first individual was that proposed worship, no matter how it originated, or what it was, or how crude, the thought was the product of some man's brain. Whether he ever stood face to face with his own idea like Moses, or Mohammed, or anyone else, makes not the slightest difference. It was a man's individual notion, prompted by fear, ignorance, or astonishment. It is the work of the brain just the same. It was their idols, images, god, gods, and men that were endowed with divinity, were held sacred, worshiped, and honored. These human inventions were supplemented by other human inventions, rites and rituals, up to this present time. We discard ideas that have been tried and found wanting for modified or new ones—as Abraham, Moses, Christ, Mohammed, Luther, Wesley, etc. The notions of these men in turn have undergone the civilizing filtering process, until there is little left but the mere sound. The Unitarians, for example, have stripped the Christian trinity down to a skeleton. They seem to say:

This was once the great bugaboo: you need not be scared, it's perfectly harmless. It has been civilized, you know. Science did it. Hell is out of fashion. Heaven we have on earth, if we have the means to do it with. We can be angels if we wish to, saints if necessary, and holy if desirable. Every man makes his own heaven, his own hell, his own angels, his own bliss, and his own god. Yes, he has his own saints and his own divinities. A woman does precisely the same thing. The imagination supplies all the necessary material for their production, selected from natural objects and put together in a manner most pleasing, acceptable, and satisfactory to each one. We make them as good as we know how, as pretty and as delightful as our taste and fancy can create them. Yet the kind of whimsical representations of the mind depends largely upon the condition of the nervous system, time of life, and our daily occupation. A young girl at puberty, whose mind is entering into that beautiful paradise of dreamland, blooming with buds of hopes and rosy wishes, experiences the delights of new sensations, creates her God, her Jesus, or her Holy Ghost, to fill the nooks of her aspirations, with all the abounding exaltation and luxuries of her creative power. Every cloud has wings, every star bright eyes that wink and beckon her to future bliss, to desires unknown yet longed for. She listens with eager ears for every sound. The zephyrs of the spring of life are wafting music to her ear. As she gazes with gushing eyes into ethereal space, she is searching the heavens for coming enchantment. Her doll, the god or the plaything of childhood, has lost its interest, and all the pretty things that formerly were so pleasing have lost their charm, as the bell and smaller infantile toy had lost theirs before the doll had nestled into her affections. Now a more realistic feeling permeates her senses, and beauties of a new and more attractive form occupy her agitated heart and brain. What is the awakening of these new emotions, the unfolding of these new

sentiments, that seem to linger on the borderland of restrained passion? Is it not the dawn of love, the transitory period, that bridge of nervous exaltation that leads from puberty to maternity? She has her own god, a figure to her notion as pure, refined, and beautiful as she can picture in the visions of her waking or sleeping dreamland mind. Her sighs, her prayers, her devotions, are directed to him. This is her coming Messiah, her angel, her everything, that is to realize all her hopes and expectations. It is her God.

Can a jockey or a prizefighter have feelings like these? The former has a horsey god, the latter a muscular. The fisherman, the sailor, the soldier, each in his sphere has his or her god. Underlying all the busy activities of daily life, whatever feelings of care or pleasure each may experience, it is but upon rare occasions he puckers his lips to give vent to his devotional feelings and whistles his Yankee Doodle—his God!

Our gods are as we make them. If we are good our god is good, if we are pure our god is pure, and if our senses are subordinate to our reason and understanding our god will be one of reason and understanding, but if we are impure, bad, and evil-minded, our senses and passions ruling supreme, reason and understanding are subordinate in our god, and the evils of animal sense predominate.

Every man is his own god. As he is, so is his god. As he makes himself, so will his god be. As he protects himself, so God will protect him. As he guides himself, so will God guide him. Whatsoever a man accomplishes for himself, that will God accomplish for him. Whatsoever a man does for himself, that God will do for him. If a man supports himself, God will support him. If he neglects himself, God will neglect him. The more he depends on himself, the surer is his dependence on God. As he saves himself, so God will surely save him. As he injures himself, so will he

be injured by God. As a man punishes himself, so will he be punished by God. God will help him who can help himself. If a man is true to himself, God will be true to him.

By industry, economy, and sobriety you will confer blessings on yourself; you have no need of God to bless you.

Make yourself a good man or woman, and you will surely have a good God.

A brutal man never has a meek god, a stingy man a generous god, nor a vicious man a merciful god. Every man brings himself to the level of a brute or lower, or to the highest type of nobility of man.

God never made man, but every man makes his god.

THE GATEWAYS THROUGH WHICH KNOWLEDGE ENTERS THE SENSES.

The functions of the brain.

Perception—Receiving impressions—Retaining impres
impressions—Knowing—Forming simple ideas
ideas—Complex ideas—Mixed ideas
complicated ideas—Conducting, transfe
and reflexation—
Coördination.

| **Sight.** | **Hearing.** | **Touch-fe** |
|---|---|---|
| Recognition | | |
| Comparing | | |
| Discernment | | |
| Attention | | |
| Retention | | |

| | | | |
|---|---|---|---|
| Succession | | | |
| Identity | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Diversity | | | |
| Continuity | | | |
| Contemplation | | | |
| Distance | | Distance | Distance |
| Color | | | |
| Solidity | | Solidity | Solidity |
| Figure | | | Figure |
| Shape | | | Shape |
| Size | long | | Size |
| | thick | | |
| | thin | | |
| Dimensions | | | Dimensic |
| Softness | | | Softness |
| Hardness | | | Hardness |
| Rough | | Roughness | Roughnes |
| Smooth | | Smoothness | Smoothn |
| Motion | | Motion | Motion |
| Action | | Action | Action |
| Dryness | | | Dryness |
| Moisture | | | Moisture |
| Fluidity | | Fluid | Fluidity |
| Vibration | | Vibration | Vibration |

| | | |
|---|---|---|
| Heat | | Heat |
| Cold | | Cold |
| | | Pain |
| | | Pleasure |
| Expansion | Expansion | Expansio |
| Contraction | Contraction | Contracti |
| Resistance | | Resistanc |
| Relation | | Relation |
| Rest | | Rest |
| Unrest | | Unrest |
| | Sound | |
| Appearance | | |
| Proportion | Proportion | Proportio |

PRODUCE

Sensations
Emotions—Feelings—
Ideation—Thought—Understanding-
Reflection—Recollection—Deliberation—In
Memory—Imagination—Judgment—Intellect—Wi
The normal products of a healthy nervous
(The abnormal result from a deranged condition of the c

## MORALS: WHENCE THEY SPRING.

To be moral means that the organs be properly and legitimately used, in accordance with the law of nature:

| STOMACH. | SEXUAL ORGANS. |
|---|---|
| For nutrition of the body. | For the propagation of the species. |

*Wants Normally Supplied.*

| | | |
|---|---|---|
| Satisfaction | | Satisfaction |
| Contentment | LEAD TO *Health* and *Happiness*, Purity, Chastity, Love, Affection, Joy. | Contentment |
| Comfort | | Comfort |
| Pleasure | | Pleasure |
| Peace | | Peace |

*Abnormal Use of the Organs.*

| | | |
|---|---|---|
| Starvation | | Passion |
| Hunger | LEAD TO Vanity, Negligence, Indolence, Deception, Discontent, Selfishness, Disease. | Lust |
| Poverty | | Overindulgence |
| Luxury | | Lasciviousness |
| Extravagance | | Vice |
| Drunkenness | | Whoredoms |

*Crime.*

*Sin.*

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*Will Power Intellectually Used.*

Industry, Integrity, Activity, Honor, Courage, Goodness, Charity, Benevolence, Sympathy, Pity, Humanity.

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Be wise, let the gods and church alone;
They're false, contrary to nature's plan.
Trespass not, there's nothing to atone.
Be human, an upright man.
All their rites and creeds are full of flaws.

As nature's products, we thrive and grow.
But we must be ruled by nature's laws
If we'd happy be—ourselves must know.
Morals! are the laws we must obey.
Infringe them not, prayers cannot save.
Though blessed, we the penalty must pay.
Not to God, or church, or priest be slave!

## CHAPTER XXX.

# THE NON CREDO.

Religion, supernaturalism, ecclesiastical control of human affairs, have done more harm than the good they have ever effected. For several thousand years they have been doing the worst of mischief—in spite of their conceited belief to the contrary—to actual enlightenment, to the advancement and prosperity of the masses, to the progress of nations generally. They have been a persistent barrier to every step forward, and have persecuted every idea that threatened in any way to interfere with their organized system. The sacred or Hebraic nationality, steeped in barbarism, washed in cruelty, and bathed in the blood of humanity, was succeeded by another organized system, the Roman Catholic church, which was by no means an improvement upon the Bible methods. They added savagery and cruelty of a more refined character. They associated with it a tyranny and a persecution that fairly blackens the pages of history. All was done, however, for the sacred cause, with the cant, sanctimoniousness, greed, and selfishness that only the church and its saintly priests could be capable of. These self-styled divine organizations ever have been, and are even now, inimical to the best social interests of humanity. Their own aggrandizement was of greater importance to them than the welfare of the oppressed.

They are the real promoters of class distinction. They are the promulgators of sectarian hate. They lessen the dignity of woman. They are the fomentors of prejudice and superstition. They are the supporters and sustainers of the opulent, the powerful, the wealthy and influential, to the detriment and debasement of the poor and more unfortunate classes. They are the actual enemies of virtue and simplicity of life—by their expensive church trappings, their gorgeous adornments, their costly decorations, their glaring exhibition, their glittering finery, their pompous display of church dress, their gilded magnificence, their showy grandeur, their ostentation and boastful ceremonies, overawing the senses, and subduing the humble, the ignorant, making them mentally more stupid, the slaves to a pernicious system of doctrine.

In ancient times, in the days of antiquity, the males were the chief worshipers. They were the privileged portion of the community, who assumed the duties to come in direct contact with all that was considered sacred, holy, or divine. Woman was considered as a defiled or polluted creature, unworthy or unfit to come within the sacred precincts of their temples or participate in any church affairs, or to minister in any of their ecclesiastical rites or ceremonies. Women had nothing to say. They have nothing to say to this day, in the Roman Catholic church especially, and in the orthodox Protestant denominations very little, because Paul lays down the law in Cor. xiv, 34: “Let your women keep silence in your churches: for it is not permitted unto them to speak; but they are commanded to be under obedience as also saith the law.”

The sacred Christian view of woman is that she is an inferior creature. She is the slave, the plaything, the toy of pleasurable gratification. God himself so ordained it, when he created Adam out of the dust and Eve out of one of Adam’s ribs. That was the Chaldean mode of explaining

her inferiority and of subjecting woman to man. These barbarians, first the Hebrews, and Christians later, did not think fit to place woman on a level with man. Therefore they placed her in the lower scale of creation as a servant and handmaid to man. The heathens, the Greeks especially, were more considerate, politer, and more refined towards women. Women were honored by them, which is evident from the composition of the council of Jupiter, the supreme divinity. This was composed of six gods, namely, Jupiter, Neptune, Mercury, Apollo, Mars, and Vulcan; and six goddesses, namely, Juno, Ceres, Vesta, Minerva, Diana, and Venus. To this assembly no other deities were admitted. There is some sense, reason, and humanity in this arrangement. It is very unlike the great masculine bully of a God, what Christians call sacred and scriptural Jehova, an intermeddling, sensual, beef-eating affair, who has sons and never tells any one where they came from, who the mother was (Gen. vi, 2): "And the sons of God," etc. Vestal virgins were admitted by the Romans to their temples, thus showing that woman was honored. She was equally privileged with man to minister to the sacred offices of the gods. Civilization has advanced, progress has been made in the arts and sciences, the intellectual faculties are more developed, and to woman has been conceded her proper place among the learned and the more liberal portion of humanity. Intellectually no line of demarcation is drawn. Cultured brain is cultured brain, whether found in man or in woman. Both sexes stand on the same platform, on an equal footing, and they receive equal honor and recognition if the mental capacity is equal. What is the relation of woman to-day to the respective churches to which she may belong? Has the Roman Catholic church receded one step from her antiquated ecclesiastical position? Or have the orthodox Protestants? Not one step! Woman still holds the same degraded position in the Christian church as she did a thousand years

ago. Circumstances have somewhat ameliorated the relative position of church and worshipers. Formerly the males were the principal church attenders and worshipers. In modern times it is the women who make the congregations. The male, if he attends, does so to please the female more than himself. Besides, the sexual attractions contribute very largely towards these Sunday entertainments. "Women" (says Maudsley, in his "Pathology of Mind," ch. iv, page 143) "are naturally more prone to religious worship than man, and more apt to fall into a morbidly subjective habit, first, because of the preponderance of the affective life in them, and secondly, because they have not the distracting and correcting and intellectually hardening influences of outside interests and pursuits which men have. If unmarried women chance to come, as by reason of those conditions they are apt to do, under the ignorant and misapplied zeal of unwise priests who mistake for deep religious feeling what is really morbid self-feeling springing at bottom from unsatisfied instinct or other uterine action upon the mind, the mischief is greatly aggravated. It were well if those who make it their business to guide the consciousness of mankind through the manifold changes and chances of life were to be at the pains to inquire how much supposed religious feeling may be due to physiological causes, before they sanction or enjoin a repeated introspection of the feelings. He whose every organ is in perfect health knows not he has a body, and only becomes conscious that he has organs when something wrong is going on; in like manner a healthy mind in the sound exercise of the functions is little conscious that he has feeling, and only gets very self-conscious when there is something morbid in the processes of its activity. The ecstatic trances of such saintly women as Catherine de Sienne and St. Theresa, in which they believed themselves to be visited by their Savior and to be received as veritable spouses into his bosom, were, though

they knew it not, little else than vicarious sexual orgasm; a condition of things which the intense contemplation of the naked male figure, carved or sculptured in all its proportions on the cross, is more fitted to produce in women of susceptible nervous temperament than people are apt to consider. Every experienced physician must have met with instances of single and childless women who have devoted themselves with extraordinary zeal to habitual religious exercises, and who having gone insane as a culmination of their emotional fervor, have straightway exhibited the saddest mixture of religious and erotic symptoms—a boiling over with lust, in voice, face, gesture, under the pitiful degradation of disease. On such persons the confessional has had sometimes the most injurious effect, more especially in those churches which spring Romanism in their ritual, have not placed confession under the stringent regulations and safeguards with which the Roman Catholic church surrounds it. The fanatical religious sects, such as the Shakers and the like, which spring up from time to time in communities and disgust them by the offensive way in which they mingle love and religion, are inspired in great measure by sexual feelings. On the one hand, there is probably the cunning of a hypocritical knave or the self-deceiving duplicity of a half-insane one, using the weaknesses of weak woman to minister to his vanity or to his lust, under a religious guise; on the other hand, there is an exaggerated self-feeling, rooted often in sexual passions, which is unwittingly fostered under the cloak of religious emotion, and which is apt to conduct to madness or to sin. In such case the holy kiss of love owes its warmth to the sexual impulse which inspires it, consciously or unconsciously, and the mystical religious union of the sexes is fitted to issue in a less spiritual union. Without doubt, an excessive development of the emotional life in any other direction would be equally pernicious. All that the unwise religious teacher

can be blamed for is his disposition to foster the egotistic development of emotion, without considering its real origin, by the overwhelming importance which he teaches the individual to attach to himself and his destiny. Instead of urging him to lessen the gap between himself and nature until he loses self in a sympathetic oneness with nature, he stimulates him to widen it more and more until he rises to the insane conceit of himself as something entirely distinct from nature—an unrelated, spiritual essence, for whose benefit the universe and all that there is has been specially created. Assuredly were not man now, as he always has been, instinctively wiser than his creeds, were he not moved by a deeper impulse than consciousness can give account of, he would make no progress in civilization."

The church has lost its grip on the male portion of society. They have considerably outgrown the ecclesiastical swaddling of scriptural doctrine of the ancient and modern theology. The woman is the stronghold as worshiper, and sustainer of the sacred masculine prerogative whom they can easily influence. By reason, as the holy book claims, of their intellectual feebleness, women are the submissive tools of cunning priests, sentimental and emotional appeals, and yield readily to their extravagant dictum. The priests exhort them, with their conventional religious phraseology, to be partakers of some mysterious glory to be found somewhere in infinite space. Keeping ever in sight the same stupefying refrain of the orthodox prayer and blessing: "Blessed and glorious trinity, trinity in unity, three—one, three persons in one God, tri-personal, triune, coeternal, coequal, God-man, O Lord God! who art one God, one Lord! not one only person, but three persons in one substance! O Lord God! Lamb of God! Son of the father! O God the son, Redeemer of the world! O God the Holy Ghost, proceeding from the father and the son! The blessing of God Almighty, the Father, Son, and Holy

Ghost, be among you. God the Father, God the Son, God the Holy Ghost, bless, preserve, and keep you. Glory be to the father, and to the son, and to the Holy Ghost. Now to God the Father, God the Son, and God the Holy Ghost, be all honor and glory. Jesus Christ, who with thee and the Holy Ghost, liveth and reigneth ever, one God, world without end," etc.

These are the terms and doxologies, forms of prayer and blessings. Can anyone conceive a more meaningless set of phrases? These are automatically repeated year in and year out, with the same intonation, gesture, whirling and buzzing in a circle. Do not the brains become blunted, the senses dulled? Or is it a mere mechanical effort, accompanied by an extraordinary amount of insincerity and actual duplicity of character? The conceit of these theological gentlemen, claiming divine superiority, is in consequence of the frequent repetition of the above vapid nonsense, that they are the truly chosen and elect, separate and apart from other people. Though they accept and place trust in the above creed, God, Son, and Holy Ghost, and delude themselves with prayers, blessings, psalm-singing, and the rest of supernatural subterfuge, do they believe that it will save them—save their bodies from dissolution, when the vital organs have ceased to perform their functions? These fixed delusions are not wholesome. Encouraging them is misleading and deceiving those who are ignorant of the actual state of nature. It is playing upon the weak and simple-minded. It means corrupting their morals and their understanding. It is paralyzing to every human effort. It is degrading manhood and womanhood. Analyze the meaning of the belief, the language employed, the associations of ideas, and seriously consider the amount of sense you can discover. Does not this rigid system of changeless belief prevent intellectual development? Does it not bar proper inquiry into the

phenomena of nature? Does it not encourage a cowardly dependence on priestcraft and hypocritical cunning? Does it not extinguish every impulse towards the evolution of thought? Does it not stamp out the energies and aspirations of man and woman? Is not the kneeling and praying before some daub of a picture or the figure of some supposed God or saint debasing and degrading to the individual? Is not the act of prayer a humiliating acknowledgement either of an enfeebled mind or of a contemptible slave? Is not the will power subdued and deteriorated and the natural energy destroyed? Are not the functions of the brain seriously interfered with, the mental faculties checked in the normal process of development, and the powers of reason stifled by the asphyxiating influences of prayer? Does it not blunt the sense of responsibility, breed insincerity, foster falsehood, promote lying, and offer a premium for wrong-doing and a shelter for crime? Imagine the stupefying effect of counting beads. The "Rosary" is a series of prayers, and consists of fifteen decades. Each decade contains ten Ave Marias, marked by small beads, preceded by a pater noster, marked by a larger bead, and concluded by a gloria patri. Five decades make a chaplet, which is a third of a rosary. What a sluggardizing effect on the intellect, what a suppression of intelligence, and how near it brings them to the borderland of monomaniacs, by the constant mumbling of those insipid compositions. The sooner we get rid of the belief in this supernatural intervention in human affairs the better for our physical, moral, and mental welfare. Every time the priest induces his pupil to repeat a prayer, he stupefies and degrades his pupil. He knocks the pins of self-restraint and self-reliance right from under him. The blessing the pupil receives, and the forgiveness at the confessional, shift the responsibility for his acts off his shoulders, thus leading him to believe himself irresponsible for any wrong he may commit. The absurd doctrine inculcated, that God made him necessarily

makes him irresponsible. If God was a fool big enough to make him bad, or silly, why should he be responsible? The priest who helps to maintain and sustain this belief, helps to weaken the pupil's mind and rather gives him license to indulge than restrains him.

You are taught to deceive yourselves and deceive others by prayer, but you cannot bribe nature; you cannot deceive nature. The penalty must be paid for every transgression. And prayers are absolutely useless, nay, every prayer is an admission of an act of cowardice, just as every blessing pronounced is a humiliation to those receiving it. What necessity is there for a man who is supposed to teach morality to be dressed like a clown in scarlet, purple, or other-colored coat and decorated with an antiquated headgear like a mountebank going through a series of peculiar gesticulations and ceremonials of buffoonery, in order to sustain this ecclesiastical humbug? Would it not be better to train the intellect by teaching the young how to observe accurately, to reason soundly from facts, to think honestly and act sincerely, have the truth revealed and nature and nature's laws soundly and practically interpreted? An insight into the secret workings of nature would lead to a more precise adjustment on the part of man to his complex surroundings, guard cautiously against the infringement of nature's laws, and correspondingly produce gain in intellectual power. How can a man be otherwise than reckless, or willfully disobedient, to laws he is entirely ignorant of, though he brings certain punishment upon himself? Can there be any better discipline than to learn the cause and know the root of all evils, in order to avoid them, thus improving the morals and inducing one to take earnest pains to do well in the future? There is more satisfaction in doing right than many may think, if people were instructed how. Unfortunately, the ecclesiastical mills of forgiveness are too busy teaching supernatural follies,

which actually mislead the ignorant and the foolish. As a foolish woman spoils her own child by her own silly conduct, so the supernatural creeds have spoilt humanity by perverting the moral responsibility in teaching their pernicious beliefs. Wonder why the world has not become better? Teach men the moral and physical laws of nature, by lessons of experience, that may guide them in their conduct through life. Teach them to learn prudence, and observe them faithfully and sincerely. Good, natural, healthy thoughts produce good actions; by their frequent repetition, generate good habits of doing well, of doing right. The nervous structures that are brought into play, the mental activities, function these excellences, developing these faculties, generating higher moral feelings. We finally come to regard as doing wrong acting contrary to our acquired habit. Good impulses to act right and do well come out of good feelings. To act otherwise becomes repugnant to our acquired habits, our second nature, and is judged unwise by our reason and understanding. Let nature teach you to be wise, and when you understand the natural you will cease to believe in aught supernatural.

Do not believe in a God—there is no such thing. Do not believe in the divinity of any man, whether he be called Moses, Jesus Christ, or Martin Luther. Do not believe that the book called the Bible, sacred scripture, and Testaments, new or old, is sacred, holy, or inspired by any supernatural being. Do not believe the story of the creation as recited in the five books of Moses—they are not true. It is a fiction, a sort of fairy tale. It is the work of the imagination of man. Do not believe in any miracle. No man can perform a miracle, except to the ignorant and stupid. No man in the Bible ever performed a miracle. Those said to have been performed were deceptions, tricks, and delusions. Do not believe in the Holy Ghost. There are no ghosts, either holy or unholy. And above all, do not

give credence to that very silly piece of nonsense, that the Holy Ghost committed adultery with Mrs. Mary Joseph, the reputed mother of Jesus Christ. Nor believe that the young man Jesus was the son of God, nor that he came upon earth to save the world from sinning. Do not believe that there are three Gods in one, Father, Son, and Holy Ghost; nor God the Father, God the Son, or God the Holy Ghost. This fallacy, compounded of Hebraic theology and Grecian mythology, is an absurd fabrication—this trinity in unity, and unity in trinity. Do not believe in a heaven, nor in a hell. You make your own heaven, and your own hell. Nor place any reliance on future rewards, or future punishments. Your good conduct will bring your rewards and your bad conduct your punishments. Do not believe in angels, spirits, or any supernatural existences. Have no faith in anything you do not understand. Place no reliance on divine interference. Do not follow blindly any ecclesiastical teachings. Rely upon yourself. Let reason and common sense be your guide. Do not pray—praying makes a coward of you. Nor place confidence in the blessing of any man, be he the pope or some fanatical preacher. Never kneel before any image, whether it be the nude figure of Christ, or a daub painting of the Virgin Mary. Do not be the dupe of priestly cunning. Do not be afraid of anything except your own bad deeds, your vicious habits, and your own transgressions.

*Some Rules and Duties in Life.*

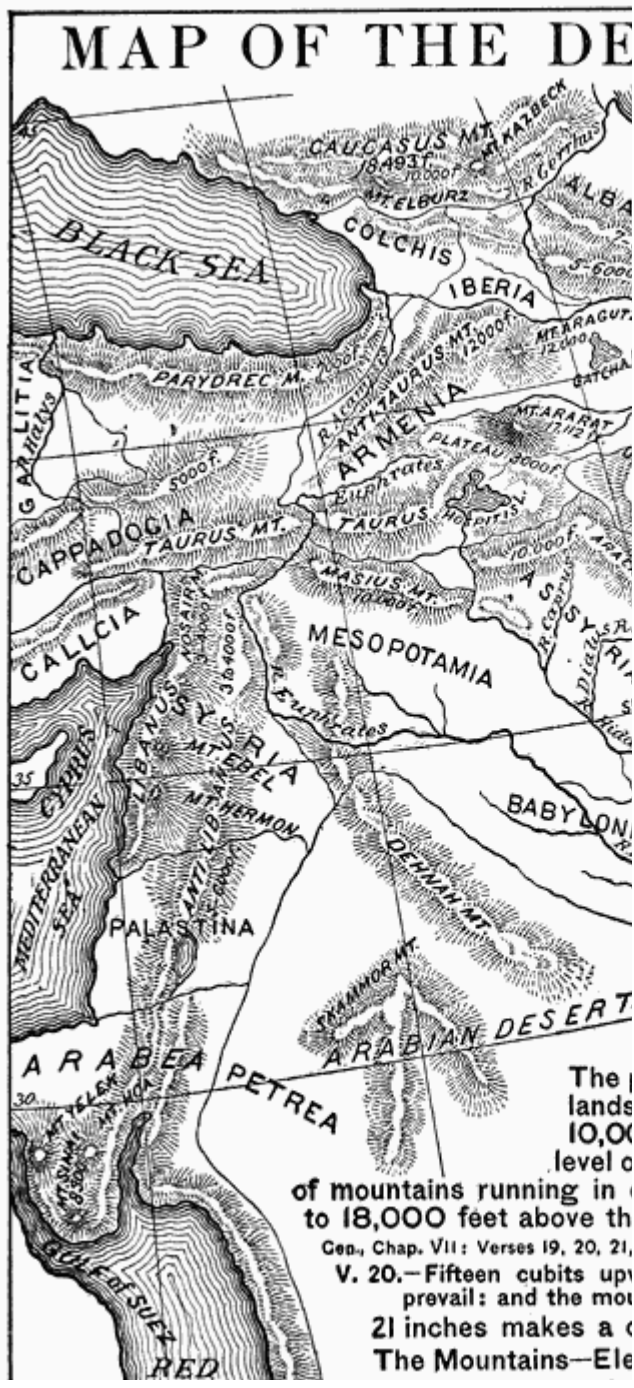
Health is essential for physical and mental labor. The maintenance of health consists in having proper food, proper clothing, and proper shelter. Work is a duty, nature demands it. Exercise that duty. Earn so much as will provide the necessary comforts in life. Indolence is a vice, and laziness a crime. They are of no good to their practicers, and a curse to others. Economy is a law of nature. Save your surplus produce of industry. It comes

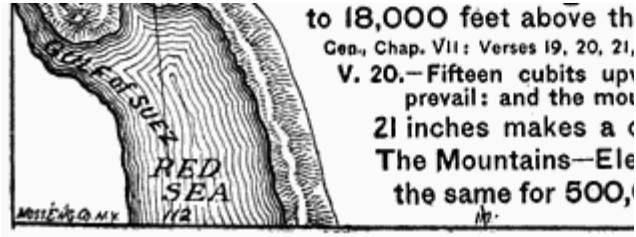
useful in time of need. Avoid excesses of all kinds. Do not overtax or over-stimulate the organs of the body. Luxuries are injurious to health. Remember the stomach is only a receptacle for food and not a cesspool for all kinds of refuse. Cleanliness of stomach and body is necessary for the healthy action both of mind and body. A rigid adherence to the natural rules is the surest safeguard against disease. Make judicious use of everything. Abuse neither yourself nor others. Each individual is his own guardian over his own acts. He himself is responsible for his own misdeeds, whether through ignorance, want of proper education or understanding, or weakness.

Our guide through life should be: Speak the truth always. Let yes and no be the form of speech. Every promise fulfill. Never deceive yourself, or deceive others. Promise nothing you cannot perform. Honesty is ennobling, dishonesty debasing. Let every word and act be strictly reliable, never waver or fail in your integrity. Be punctilious in your duties towards others. Do not cheat yourself or your neighbors. Misrepresentation is wrong. Have confidence in yourself, others will have confidence in you. Do not slander others, lest you do an injury, doing evil without benefit to yourself. A slanderer is despised. Let your motives be pure, your purpose upright. Be mild in speech, even in temper. Kind words are inexpensive. Anger and passion are brutal qualities, be human. Do not get excited over trifles, it does not prolong life. If your habits are bad, mend them. Good impulses come from good feelings, as bad impulses from bad feelings. Our character is molded by our habits, as our habits are by our instruction. By your conduct gain the esteem of your fellow-men. It is better to be loved than hated. Injure no one. Despise no one. Be neither prejudiced nor bigoted. Gain the respect of every man, and respect those that deserve to be respected. Obey the existing laws. Learn to

depend on yourself. Trust in your own judgment, none will be so true to you as yourself. Hope is delusive, action is certain. Reveal not your own thoughts to others lest they betray you. Confidence, self-possession, and presence of mind guard against surprises. Do not mind other people's business, you may not find time to mind your own. Negligence is a fault, diligence is a virtue. Frivolity is the froth of life. It has neither strength nor substance. There is more satisfaction in an ounce of peace than in a ton of wrangling. Control your appetites, subdue your passions, if you would be human. Remember there is no heaven beyond this life, therefore make your home and your life as beautiful as you can. Few wants well supplied, is better than many wants unsatisfied. Desire nothing you cannot obtain, it will save you annoyance. Do not assume to be what you are not. Nature has marked you. Do not be tempted by trifles, life is too short and time too precious. Pleasures are enjoyable where the senses are not overstrained. Be not too proud, nor too vain, no matter how great you are; man, like the animal, is composed only of eighteen elements. Ambition is laudable, when others are not made to suffer. Do not try to be greater than you are; a gill will never fill a pint. Gain understanding, and let reason and common sense guide you in all your acts. Look out. Save your honor, your integrity, and your character. Our duty on earth is to be good, to do right, and contribute to the betterment of our fellow-men. The higher we rise in intelligence, the farther we are removed from the brute. Free yourself from all supernatural notions, all antiquated beliefs, and all superstitions. The humanization of mankind marks the progress of civilization. The excitement of pleasure is not lasting; exhaustion stops all enjoyment; too much sunshine is fatiguing; too much laughter is trying. Empty stomachs make a bad audience, hunger breeds discontent. Poverty is degrading; it ruins health, breeds disease, and lowers the morals. Neglect yourself and

everybody will neglect you. Lost opportunities are seldom recovered. The higher you climb the farther you are removed from the lower levels. One wrong act loses the balance of integrity, our esteem suffers. One grain of intelligence is worth a pound of brute force. Be prudent, discreet, and deliberate in all transactions in life, but quick in decision. Distrust persuasive, bland, smooth, suave talkers. A pious hypocrite is the worst of frauds. Your own faults are the greatest misfortune. A brave man is never discouraged, and simpletons are the prey for sharpers. Don't be a coward in danger, or pray when disaster overtakes you. Self-abuse is the worst abuse. Your expenditure should never exceed your income. Aspire to be better, not worse. You cannot get wealthy on nothing. Millionaire and beggar belong to this earth, whether living or dead. Our success in life depends on the quality of Brain. Polished steel is of greater value than common iron ore, so are intellectual faculties of greater worth than uncultured brains. The weaker must yield to the stronger. The friction of life is great; the less the resisting force, the sooner it yields. In the struggle the strongest survive. Tenacity to life and tenacity to our possessions lead to success. Let those who accumulate great wealth unjustly, yield it readily to those who are most in need. A man can accumulate vast riches only by the industry of many, never by his own. Remember dead men enjoy nothing, therefore be wise, be reasonable, make your heaven on earth, your paradise of your home. Be your own God, your own Savior, your own priest.


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Gen., Chap. VII: Verses 19, 20, 21, 22,

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# Colophon

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## Metadata



| | | |
|---|---|---|
| **Title:** | The creation of God | |
| **Author:** | Jacob Hartmann | Info |
| **Language:** | English | |
| **Original publication date:** | 1893 | |



## Revision History

2019-05-12 Started.

## External References

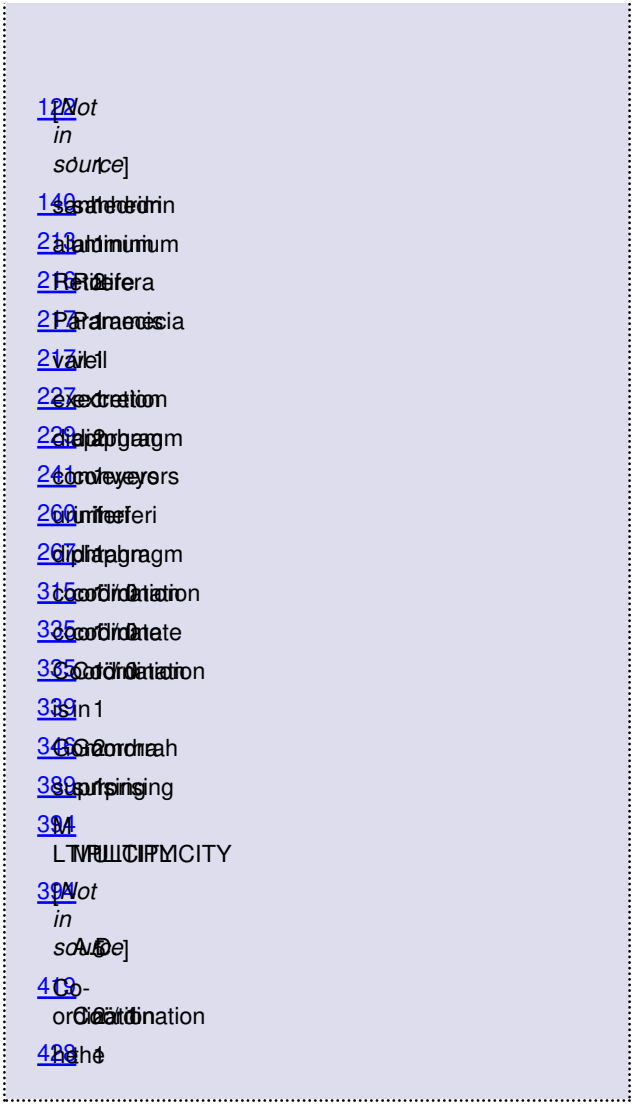
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## Corrections

The following corrections have been applied to the text:

| Page | Correction | Edit distance |
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4, 132, 394 [*Not in source*]
5, 153, 191, 292, 394, 394
394 [*Not in source*]
26 phenomena
29, 38, 97, 175, 401 light
34 Bischoff
36 Auto-da-fé 1 / 0
37 [*Not in source*]
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103 [*Deleted*]
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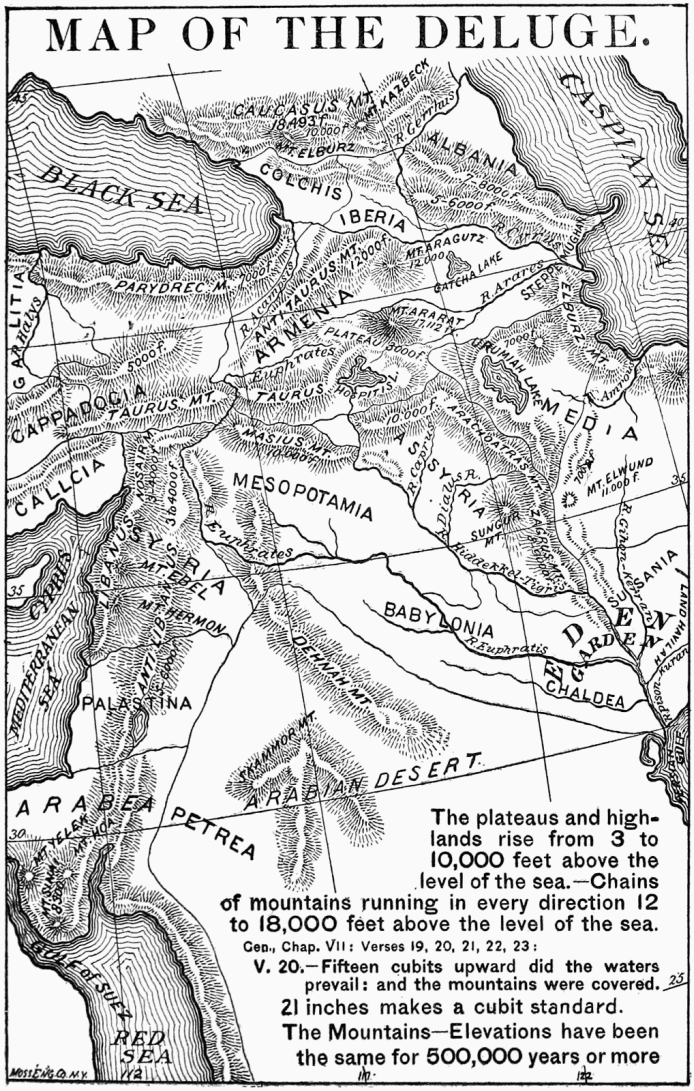
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CHALDEA
PALESTINA
MEDITERRANEAN SEA
ARABIAN DESERT
ARABEA PETREA
MT. HOR
GULF OF SUEZ
RED SEA
The plateaus and highlands rise from 3 to 10,000 feet above the level of the sea.—Chains of mountains running in every direction 12 to 18,000 feet above the level of the sea.
Gen., Chap. VII: Verses 19, 20, 21, 22, 23:
V. 20.—Fifteen cubits upward did the waters prevail: and the mountains were covered.
21 inches makes a cubit standard.
The Mountains—Elevations have been the same for 500,000 years or more

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