

FREETHOUGHT JOURNAL

IN THINGS DEMONSTRATED CERTAIN

UNITY

ION

IN WHATSOEVER MAY BE DOUBTED

FREE DIVERSITY

ENCE

IN ALL THINGS

CHARITY

ECTION

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DARWIN—HUXLEY—TYNDALL.

BY ALLEN PRINGLE.

Within the last year or two we have had published in the *Toronto Weekly Globe* portraits and biographical sketches of these three eminent scientists; and this fact constitutes one of the unmistakable signs of the rationalistic tendencies of this age—a tendency which is not confined to the cultured classes, but permeates the commonality of the people. A few years ago no newspaper could mention Darwinism or the name of Darwin without denunciation or cheap ridicule. They would tell us that according to Darwin "man came from a monkey," we had a "baboon for our great grandfather," etc., and this stuff readily passed muster not only as good wit but crushing argument. Nor was the bad wit and worse logic confined to country editors and local preachers, but the same stock was vigorously vended by the respectable theologian and quasi theologico-scientist.

These things are now, however, quite changed. We find the names at the head of this article commanding respect, if not admiration, almost everywhere. In publishing the portraits and sketches of these scientific rationalists the *Globe* (which, by the way, will hardly be suspected of any partiality towards "infidelity") has not one word of disparagement or derogation. Of Darwin it says:

"The name of Mr. Darwin is more familiar to the general public than that of any other living natural philosopher, not even including Tyndall or Huxley, while he is second to none in the amount and importance of the contributions he has made to physical science. He is noted for the possession of a pre-eminent degree of that faculty of observation on which all true scientific progress is based. * * * He has furnished to the world a

larger collection of new and valuable facts in natural history than any other observer, except, perhaps, Linnaeus, and even his most pronounced opponents make no attempt either to underrate the value of his labors or question his sincerity and single-mindedness as a philosopher. The system which goes by his name, and of which he is to some extent only the unconscious author, has hosts of adherents in many lands, even more on the continent of Europe than in either Great Britain or America. * * * As might be expected, Mr. Darwin's eminent services in the cause of science have been amply recognized by the various home and foreign scientific societies, of several of which he is a member, and from more than one of which he has received honorable marks of distinction."

Of Prof. Huxley, whose portrait and sketch appeared last April, the *Globe* says:

"A high authority has told us that the man who makes two blades of grass to grow where only one grow before deserves better of mankind and does more essential service to his country than the whole race of politicians put together. Like most aphorisms from the same source, this saying is pregnant with truth, and commends itself to the judgment of all who read it. And if the principle be sound, the subject of this sketch has been a greater public benefactor than many whose names are more frequently at the tip of the public tongue. In an age eminent for scientific discovery and research, Thomas Henry Huxley has won a position second to that of no man of his age. * * His style, both as a writer and as a lecturer, is remarkable for clearness and terseness of expression. * * Most persons whose minds are free from bias recognize in him an honest expounder of a rational faith, the first object of which is the discovery of truth. * * He is a bold and fearless thinker, who is not to be turned aside from plain scientific conclusions at the bidding of any man. * * While many may doubt the accuracy of some of his conclusions, no one can doubt that they have been conscientiously arrived at, and that they legitimately follow from what scientific men regard as fixed premises."

Of Tyndall, who appears in the issue for May 17, 1878, the *Globe* thus speaks:

"In common with his friend Prof. Huxley, he possesses in a

remarkable degree the power of clear and lucid explanation. * * * There can be no doubt that he has made a distinct and lasting mark upon the age in which he lives."

This is all very good, and we thank the *Globe* for its liberality. It is an encouraging omen when the press thus finds itself compelled, in response to a liberalized public sentiment, to do this measure of justice to these three great apostles of modern science, the logical outcome of whose teachings is the utter destruction of Christian theology. If the popular newspaper accurately reflects the average sentiment of its readers this action of the *Globe* is evidence of marvelous progress in Canada, and augurs well for the future, the infamous decision in the Napanee "Town Hall case" to the contrary notwithstanding. For nations to outgrow the tyrannical laws of their country, and leave far behind them intolerant and effete hierarchies, are among the commonest facts of history. Then follow repeal, reconstruction, and a healthy formation in the body politic. The civilized world of to-day has entered upon that stage, and will inevitably bring up with this result in due time. Before the Darwins, Huxleys and Tyndalls of the latter half of this nineteenth century the effete theologies and crystalized errors, hoary with the age of centuries, are melting like wax. Froude tells the whole story in one sentence: "Doctrines once fixed as a rock are now fluid as water." Towards the consummation of all this we will diligently continue to work in our humble way. No adverse judgments in Queen's Bench or mediæval confiscations of Liberal literature in the Toronto Custom House will deter us in the least. Our motto is progress, and our watchword onward. We aim at the physical as well as the mental salvation of mankind here in *this* world. We believe in *bodily*, as well as mental and moral purity. To attain this we must study, not Bibles and creeds, but Nature and ourselves. "The highest study of mankind is man."

Selby, October, 1878.

EXTRACTS AND NOTES.

The *Christian Life* thinks the "silly season" has fairly set in, as the "Church" papers are now discussing the question: "Ought clergymen to wear moustaches?" The "Church" papers have, at last, found an appropriate mission, and we have no doubt the young ladies of the various congregations will take a lively interest in the discussion.

From our excellent contemporary, the *Literary World*, we learn that the "Indianapolis Literary Club" has been exercised with this question: "Was Charles Dickens a Christian?" We had always thought that Indianapolis was a civilized sort of place; but the discussion of such a question makes us fear that the city is still in a state of heathendom.

In the Cowden Clarke "Recollections"—just published—we are told of a certain Calvinistic minister who made use of the following "grace": "Whereas, some have appetite and no food and others have food and no appetite; we thank thee, O Lord, that we have both." Mr. Charles Cowden Clarke, one of the most genial and simple hearted of men and an early companion of the poet Keats, was a great admirer of "the high chief of Scottish song," and he ought to have known that the holy man stole his prayer from the "Infidel" Bob Burns. His words are:

"Some hae meat and canna eat,
And some would eat, but want it;
Now we hae meat and we can eat,
And see the Lord be thankit."

Theologians transmogrify the pure precepts and devotion of Jesus into a religion as nearly as possible their opposite, and then decree that whoever will not accept their travesty "without doubt shall perish everlastingly." It is the old spectacle which so disturbed Jeremiah reproduced in our own days: "A wonderful and horrible thing is committed in the land; the prophets prophesy falsely and the priests bear rule through their means; and

the people love to have it so; and what will be the end thereof?" —*W. R. Gray.*

The risk of asking uncertain questions is thus illustrated by the *Interior* "We were talking to a mission school on Darius throwing Daniel into the lion's den. We made as clear as we could the fact that Daniel had a better time that night than the king, slept more sweetly, and all because he had a quiet conscience. 'Darius couldn't sleep, could he?' By unanimous consent, 'No, sir.' 'And why couldn't Darius sleep?' 'Because he was bad.' Having thus developed the conscience-point, we launched our final question with a good deal of confidence, 'Well, now, dear children, what is it makes the bed soft?' Quick as flash from a four-year old came the reply, 'Bedders.' That closed the ethical discussion."

Some years ago I stepped into a school of considerable fame in Edinburgh, where I found the teacher laboring to instruct a class of twenty-five or thirty of various ages, from ten to fifteen, in the nature and functions of conscience. He duly informed the youngsters that it was "an inward monitor"—that, as before iron-clads were heard of—and, moreover, that it was "the candle of the Lord"—none of the children of Auld Reekie had, up to that time, seen anything superior to a *babes* dip. Doubting whether he had quite illuminated the subject to the satisfaction of his audience, the Dominie told the following story by way of *anecdote*, as he phrased it:

The other Sabbath morning—the Scotch are careful to avoid the heathen word Sunday, though they readily enough use Monday, &c.—as I was walking to church with my wife and family, I saw a friend of mine, or rather I should say an acquaintance—for I disdain to "enter on my list of friends," as the pious and immortal Cowper says, a man who is a Sabbath-breaker. Well, this man was, as I subsequently learned, going to the top of Arthur's Seat with his three sons as companions. The boys were quite elated at the prospect of having such an excursion before them, and I could see that *my* three boys would have preferred going with them to coming along with me to church. Such, my dear children, is the corruption of poor human nature. I took them to church *twice* that day and sent them also *once* to the Sabbath school. They were not pleased in the morning; but after two rousing sermons by Dr. Chalmers and after spending two hours in the school room, repeating the shorter catechism (with all the proofs) they went to bed quite "reconciled to their lot," and, I may say, truly happy. But as to the unfortunate boys who had spent the greater part of the blessed day in worshipping, "in the outer temple," as the father profanely said, how do you think they felt when they laid their heads on their pillow that night? How do you think they felt, I say. The class was evidently puzzled, and all were mute. At last, after his repeatedly putting the question in the wild, excited state that the Scotch teachers indulge in, a *vec callant* held up his hand, in token that *he* could tell. "Well, Willie, how did they feel?" "Vera sleepy, sir! vera sleepy!" The Dominie "smiled horrible a ghastly smile," the class laughed, and I bolted.

VIATOR IGNOTUS.

The *Montreal Witness* reported the betting before the Hanlan-Courtney race something in this style: The arrival of the American and Western Ontario contingents unhappily stimulated the betting. We are grieved to say that Hanlan sold at two to one in the pools. It is with unfeigned regret that we announce a bet of \$1,500 to \$600 on the Canadian champion; and it pains us to have to announce that the pool-buyers seem bent on maintaining these odds on him, etc., etc. The "only religious" gave every point the gamblers made, but maintained its Pecksniffian reputation by the interjection of plaintive adjectives. O, Morality, how hypocrisy thrives in thy name!—*Toronto Mail, Oct. 4.*

HOW THEY MANAGE IN BERLIN.—It is reported that in Berlin, with a population over a million, only about thirty-five thousand persons regularly attend public worship, and that twenty thousand burials take place every year without any religious service.

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TORONTO, OCTOBER, 1878.

WHAT WE OFFER.

This number completes the first year's existence of THE FREETHOUGHT JOURNAL. When the first number appeared many of our Christian friends (or enemies) confidently asserted that "no infidel sheet could exist six months in this 'Christian Canada of ours,'" and we have no doubt that the wish was father to the prediction, but their wish has been in vain and their prediction unfulfilled. Thanks to a few Liberal friends, we have been able to withstand the storm of opposition, and, if our friends will respond promptly to the liberal offers we make below, the JOURNAL will become a success and be placed upon a firm financial footing. The JOURNAL will continue to be strictly anti-theological, and its pages will be open for the discussion of all questions which are agitating this age of progress. If our Spiritualist friends, and those especially interested in Labor Reform, favor us with their communications a portion of our space will be devoted to their interests. Neither of these classes have at present any medium in Canada through which to advocate their cause, and we hope they will rally to our support—at least until they can each support an organ wholly devoted to their views.

In last issue we stated that all those who remitted cash for the JOURNAL on or before the 30th of October would be entitled to a premium in photographs, pamphlets, etc. We now extend the time for such remittances to the 30th of November, 1878. To all those who respond on or before that date we will send post-paid any four of the following photographs, viz.: Mrs. Annie Besant, Charles Bradlaugh, Colonel Ingersoll, B. F. Underwood, Mrs. Sara A. Underwood, Edward Hanlan, William Callen Bryant, Ralph Waldo Emerson, Tyndall, Darwin, Huxley, Herbert Spencer, Proctor, Earl Salisbury, Earl Beaconsfield, or any of the well-known actors, actresses, poets, divines, oarsmen; or one cabinet size photograph of any of the following, viz., Tyndall, Darwin, Huxley, Spencer, Mrs. Annie Besant, Charles Bradlaugh, Hanlan, or any of the celebrated oarsmen of America; or any Liberal books and pamphlets the retail price of which is not more than

twenty-five cents. The small photographs retail at seven cents each, and the cabinets at from twenty-five to forty cents each.

To any one who will send five new subscribers with five dollars, besides sending to each subscriber as above, we will send post-paid to the getter-up of the club a copy of the "Symposium"—a book which has created a tremendous stir in the theological world. Price, \$1.

For ten new subscribers with ten dollars we will send, besides premiums to each subscriber, a copy of "Greg's Creed of Christendom," noticed in last issue; price, \$1.50.

For twenty subscribers, ten of whom must be new subscribers, with twenty dollars, beside premiums as above, we will send post-paid a copy of D. M. Bennett's "Champions of the Church," a book of over 1,100 pages, and which gives the history of most of the eminent Christians, from Jesus of Nazareth to Henry Ward Beecher; price, \$3.

All the above books are elegantly bound, intensely interesting to every Freethinker, and should be in the library of every Liberal who can afford to purchase them. Here is a chance to obtain one or more of them by a little exertion in a cause which we should all have at heart.

Let every Freethinker, Spiritualist, and Labor Reformer in the Dominion send in their subscriptions before the 30th of November, and, besides receiving the premiums offered, help to sustain the only paper in Canada in which they can express an honest opinion. It rests with you, Liberals of Canada, to make THE FREETHOUGHT JOURNAL a permanent institution in our country. Shall it be done?

EDITORIAL NOTES AND NOTICES.

From want of space we are compelled to omit the last section of Mr. Coleman's article on "Comparative Evolution of the Lower Animals and Man," sub-headed "The Destiny of Man." We will give it in our next issue under the latter heading.

Mr. B. F. Underwood will be in attendance at and address the Liberal League Congress at Syracuse on the 26th and 27th insts., and will lecture in Toronto on the 1st, 2nd and 3rd of November on the following subjects: "The Fallacies of the Rev. Joseph Cook," "The Influence of Christianity on Civilization," "What Liberalism Offers in Place of Christian Theology."

The Rev. Joseph Cook, of Boston, is to lecture this month before the Y. M. C. A. of this city.

Lecture committees who desire to secure first-class lectures on scientific, social, religious, and anti-theological subjects, should communicate with Charles Ellis, 8 Portland street, Boston, Mass.

Before leaving Ithaca for his home in Toronto, Mr. Goldwin Smith delivered a lecture on "The American Electorate." The lecture, we need hardly say, was marked by great ability, and it will, no doubt, be severely handled and differently interpreted by our Canadian journalists. Fortunately we can say: "*Non nostrum inter vos tantas componere lites.*" We have nothing to do here with political questions, but we should like to see our superlatively orthodox and "unco guid" contemporary, the *Globe*, test and try its teeth against this file: "Republicanism begins to be like theological orthodoxy—openly professed and privately derided." Effete orthodoxy! "None so poor to do it reverence!"

"Openly professed and privately derided!" Things *have* come to a pretty pass.

Public attention is directed to the medical card of Dr. Fenton, which appears in another column. Although only recently established in Oshawa, Dr. Fenton has, by the use of electricity in connection with baths, etc., afforded unquestionable relief to many afflicted ones, and is curing ailments which seemed to resist the operations of ordinary medical treatment. By the electric baths the system is thoroughly cleansed, and there is no danger of injuring with drugs. As a medical gentleman Dr. Fenton holds ample credentials, and any one requiring advice or treatment may consult him with confidence. The Doctor is thoroughly Liberal, and we believe thoroughly reliable.

COSTS FUND.

I have received the following contributions to the above fund through Albert White, Esq., of Orwell, Elgin Co., Ont., and have been authorized by him to publish the names:

Albert White, Orwell	\$5 00
Joel Lewis, Orwell	5 00
S. Martin, St. Thomas	5 00
J. S. Campbell, St. Thomas	2 00
Thomas E. Bailie, St. Thomas	1 00
Jable Robinson, St. Thomas	1 00
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Noah Gavity, St. Thomas	1 00
Lorenzo Clapp, St. Thomas	0 50
W. A. Glover, Aylmer	2 00
H. P. Brown, Aylmer	1 00
Jas. Brown, Aylmer	1 00
Dr. R. W. McLay, Aylmer	1 00
Adney Bradley, Aylmer	1 00
Lindley Moore, Port Bruce	5 00
Captain Thompson, Port Bruce	1 00

Mr. White also sends \$5.00 from other parties who do not wish their names published.

The signers of "Circular" have been assessed \$30.00 each, and have responded as follows:

B. F. Underwood	\$30 00
W. Sisson	30 00
Toronto Freethought Association	31 00
John Groom and Meaford and Owen Sound Liberals	40 00
J. C. Kearns, Treasurer of Ottawa "Progressive Society."	30 00
Wm. McDonnell and Lindsay Liberals	30 00
C. E. Hall	30 00
F. Van De Bogart	30 00
M. B. Wager	30 00

ALLEN PRINGLE.

The following sums have been received by the editor of the JOURNAL and forwarded to Mr. Pringle:

John H. R. Molson, Montreal	\$10 00
Chas. S. Burroughs, Montreal	1 00
Z. Turgeon, Montreal	1 00

Forwarded through Mr. W. B. Cooke:

F. T. Jones	5 00
John Taylor	2 00
Eyre Evans	2 00
From others	35 00
Through R. B. Butland, from James Brown, Galt	20 00

We are permitted to publish the following letter:

My DEAR MR. COOK.

Enclosed you will please find the sum of five dollars, the amount of my subscription to the fund now being raised in Toronto to indemnify Mr. Allen Pringle, of Napanee, against the heavy costs to which he has been unjustly put, in the suit brought by him against the Town Council of Napanee, the result of which, in my opinion, involved an outrageous denial of justice, being simply a new version of the old cry of orthodox bigotry, "Keep no faith with heretics." Mr. Pringle's suit was a battle on behalf of freedom of conscience, and liberty of thought and discussion, and it is the duty of all whose devotion to those priceless blessings is genuine and not spurious, to take care that he does not suffer for his manliness. It is greatly to be regretted that the suit could not be carried by appeal to the Privy Council, in England, where there is far more liberality in matters of religious opinion than there is in this country. Whether orthodox will gain in the end by having sanctioned the deliberate breach of a solemn contract entered into by a public body, is a point on which many persons will have no difficulty in forming an opinion.

You are at liberty to make whatever use of this letter you think proper.

Yours faithfully,

F. T. JONES.

HEAT, MOTION AND CONTINUITY.

BY W. B. COOKE.

A few passages from leading thinkers will indicate the restlessness and also the tendencies of modern materialistic thought. Cazelles says: "The universe, whether regarded as a whole or in the marvelous variety of its details, presents itself before us as an enigma. The mightiest intellects are by an irresistible force constrained to seek its explanation, and whatever restraints are put on the mind, humanity will never be indifferent to research. Religion as well as science in this searching age must face criticism. * * Criticism has changed its character, science is no longer a rival of religion, but an independent power. Of all the beliefs which the philosophers of the last century have bequeathed to our age, none has struck such deep root as the belief in the progress of humanity. It grows every day, and deserves to be considered one of the chief characteristics of thought of the nineteenth century. Labors which rank among the most admirable of contemporaneous science have spread abroad the idea that the mechanical, electric, magnetic forces—heat, light, chemical processes, vital processes—are, so far as we can see, so many manifestations of one and the same force which is converted into one or other of these equivalents." Bastian says: "The doctrine that matter is indestructible may be regarded as one of the most universally accepted utterances of science. It is already firmly rooted, and the belief in its truth is gradually spreading deeper and wider as education advances. Of late years experimental investigators have been gradually tending towards the recognition of the complementary doctrine of the essential oneness and indestructibility of force. Matter is indestructible, force convertible into an equivalent, but never destroyed. Forces are 'modes of motion,' and motion is continuous." Strauss says: "Matter and motion include all phenomena; matter infinitely agitated which by differentiations and integration develops itself to ever higher forms and functions, and describes an everlasting circle by evolution, dissolution, and then fresh evolution. Spencer says: "That the law of organic progress is the law of all progress, whether it be in the development of the earth, in the development of life, in the development of society, of government, of manufactures, of commerce, of language, literature, science, art. The same evolution of the simple into the complex through a process of continuous differentiation hold throughout." Huxley says: "The doctrine of evolution at the present time rests upon exactly as sure a foundation as the Copernican theory of the motions of

the heavenly bodies. Its basis is precisely of the same character, the coincidence of the observed facts with theoretical requirements."

Leaving these authorities on the doctrine of evolution, I will now give you a sketch of Laplace's (1780) nebular theory, epitomized from Spenser's "Progress; Its Law and Cause." "If this hypothesis be true," says Mr. Spenser, "The Genesis of the solar system supplies one illustration of this law. Let us assume that the matter of which the sun and planets consist once existed in a diffused form, and that from the gravitation of its atoms there resulted a gradual concentration. By this hypothesis the solar system in its nascent state existed as an indefinitely extended and nearly homogeneous medium—a medium nearly homogeneous in density, in temperature, and in other physical attributes. The first advance towards consolidation resulted in a differentiation between the occupied space which the nebulous mass still filled, and the unoccupied space which it previously filled. There arose in this state or condition a contrast in density and a contrast in temperature, between the inside and the outside of this mass, and as a constant property of matter is motion, there arose throughout the volume rotary movements, whose velocities varied according to their distances from its center. These differentiations increased in number and degree until there was evolved the organized group of sun, planets, and satellites which we now know. A group which presents numerous contrasts of structure and action among its members. There are the immense contrasts between the sun and the planets in bulk and in weight, as well as the subordinate contrasts between one planet and another, and between the planets and their satellites. There is the similarly marked contrast between the sun as almost stationary and the planets as moving round him with great velocity, while there are the secondary velocities and periods of the several planets, and between their simple revolutions and the double ones of their satellites, which have to move round their primaries whilst moving round the sun. There is yet the further strong contrast between the sun and the planets in respect of temperature; and there is reason to suppose that the planets and satellites differ from each other in their proper heat as well as in the heat they receive from the sun." Now, how is this heat generated, and how is it kept up? There is the theory known as the meteoric theory of the sun's heat. Tyndall says: "Knowledge such as we now possess has caused philosophers, in speculating on the mode in which the sun is nourished and his supply of light and heat kept up, to suppose the heat and light to be caused by the showering down of meteoric matter on the sun's surface." This is Meyer's hypothesis, worked out in 1848.

What foundation is there for this hypothesis? That heat is generated by motion, friction, compression, and percussion Tyndall gives an experiment in one of his lectures. He cools a razor by contact with ice, rubs it on a hone without oil, as if to sharpen it; he places the razor against the face of a sensitive pile with a needle attached which marks slighter variations of temperature than the ordinary thermometer. The audience sees a powerful deflection of the needle, which declares the razor to be hot. To prove heat by compression he places a piece of deal wood between the plates of a small hydraulic press and squeezes it forcibly; after compression he brings the wood in contact with the pile, which declares heat has been generated by compression. To produce heat from percussion he takes a cold lead bullet, places it on a cold anvil, and strikes it with a cold sledge hammer; examine the lead and it is heated; and says: "If we could gather up all the heat generated by the stroke of the sledge and apply it without loss mechanically we should be able by means of it to lift the hammer to the height from which it fell." Now, what proof have we for that? Dr. Meyer, of Heilbronn, in Germany, enunciated the exact relation which subsists between heat and work, giving the number which is now known as the mechanical equivalent of heat. Mr. Joule, of Manchester, independently of Meyer, experimented to prove the invariability of the relation which subsists between heat and ordinary mechanical force. He placed water in vessels, agitated that water by paddles driven by

measurable forces, and determined both the amount of heat developed by stirring the liquid and the amount of labor expended in the process. He did the same with mercury and with sperm oil. He also caused disks of cast iron to rub against each other, and measured the heat produced by their friction and the force expended in overcoming it. He urged water through capillary tubes and determined the amount of heat generated by the friction of the liquid against the sides of the tubes. This is a delicate experiment.

"The results of his experiments," says Tyndall, "leave no shadow of doubt upon the mind that, under all circumstances, the quantity of heat generated by the same amount of force is fixed and invariable." Again, Count Rumford, while boring a cannon at Munich in 1798, was so forcibly struck by the amount of heat developed in the process of boring that he contrived an apparatus for measuring the amount of heat generated by friction. He constructed a hollow cylinder of iron, filled the cylinder with 18½ pounds of water at 60°, caused the bottom of the cylinder to be pressed against the part of the cannon where friction was greatest. An hour after the friction was commenced the temperature of the water was 107°; the second hour it was 142°; at two hours and thirty minutes after the commencement the water actually boiled. By these and numberless other experiments it was found that the quantity of heat which would raise one pound of water one degree in temperature is exactly equal to what would be generated if a pound weight, after having fallen through a height of 772 feet, has its moving force destroyed by collision with the earth. Conversely, the amount of heat necessary to raise one pound of water one degree in temperature would, if all were applied mechanically, be competent to raise a pound weight 772 feet high, or it would raise 772 pounds one foot high. Thus the quantity of heat necessary to raise the temperature of a pound of water one degree being taken as a standard, 772 foot pounds constitute what is called the mechanical equivalent of heat. To establish these statements Mr. Tyndall performs many experiments. He drops a leaden ball from the top of the lecture room; measures the heat generated in the descent and concussion. Fires a rifle bullet at a target; measures the heat generated by the known velocity. "But a rifle bullet, if formed of lead, moving at a velocity of 223 feet in a second, would generate, on striking a target, an amount of heat which, if concentrated in the bullet, would raise its temperature 30°; with six times this velocity it will generate thirty-six times this amount of heat. Hence, 36 times 30, or 1,080°, would represent the augmentation of temperature of a rifle ball on striking a target with a velocity of 1,338 feet a second. This is more than sufficient motion to fuse the lead." From these and other considerations he concludes that it is manifest that if we know the velocity and weight of any projectile we can calculate with ease the amount of heat developed by the destruction of its moving force." For example: "Knowing as we do the weight of the earth and the velocity with which it moves through space, a simple calculation would enable us to determine the exact amount of heat which would be developed, supposing the earth to be stopped in her orbit." Meyer and Helmholtz have made this calculation, and found that the quantity of heat generated by this colossal shock would be quite sufficient not only to fuse the entire earth, but to reduce it in great part to vapor." "Thus," says Mr. Tyndall, "by the simple stoppage of the earth in its orbit, the elements might be caused to melt with fervent heat." The amount of heat thus developed would be equal to that derived from the combustion of fourteen globes of coal, each equal to the earth in magnitude. And if, after the stoppage of its motion, the earth should fall into the sun, as it assuredly would, the amount of heat generated by the blow would be equal to that developed by the combustion of 5,000 worlds of solid carbon."

Heat can produce mechanical force, and mechanical force can produce heat. Some common quality must therefore unite this agent and the ordinary forms of mechanical power. This is proved to be motion.

There are two theories of heat—the material and the dynamical

or mechanical. The material theory of heat supposes it to be a kind of matter—caloric—a subtle fluid, stored up in the interatomic spaces of bodies. The dynamical theory discards the idea of materiality as applied to heat. The supporters of this theory do not believe heat to be matter, but an accident or condition of matter—a motion of its ultimate particles. Whether heat is matter or a property of matter, there is no conception of heat or cold, hard or soft, sound or silence, dark or light, life or death; apart from matter all are conditions, and have no existence independently of matter. Faraday proves in his lectures on the chemistry of a candle, that when a candle burns the substance of the candle is not lost or destroyed, but has simply become insensible to our powers of vision. That these various forms of energy are mutually convertible; that we can express any one of them in the terms of any other, and therefore that a certain quantity of one form is equivalent to, or may be made to produce, a given quantity of another form. This new philosophy, as Tyndall calls it, declares that heat has no existence independently of matter; that what we call heat is only a peculiar condition of matter, viz., a vibration of its ultimate particles, so that as heat is nothing but motion, we can measure heat as we measure common mechanical energy by a weight falling through a given space. It further shows us, by virtue of convertibility and owing to the possibility of expressing each of these in terms of common mechanics, that the destruction or creation of energy in the world is just as impossible as the creation or destruction of matter itself. Helmholtz, Meyer, and other philosophers have speculated on what Herschell calls the grand secret of the power supporting the constant light and heat which the sun continually pours upon the universe. It is admitted that it cannot be kept up by ordinary combustion. Herschell says: "It would be burnt out in 4,000 years, yet geology teaches that the sun has shone on our earth as it does now for hundreds of thousands years."

In one of his lectures Tyndall gives speculations of philosophers which show that if a meteoric or asteroid were to fall into the sun with the greatest velocity which it is capable of acquiring, it would, in falling, engender a quantity of heat 10,000 times as great as that which would be developed by the combustion of an equal weight of coal. This makes motion superior as an heat-giving power to any combustible we have knowledge of. These meteorites are known to fall on the earth in certain seasons in large numbers. During an observation in Boston of nine hours 240,000 meteors were observed. The number falling on this earth in a year may be estimated at hundreds or thousands of millions, and these would only be a small portion which circulate round the sun. Astronomers seem to think it probable that the lens-shaped mass, termed by us the zodiacal light, which surrounds the sun consists of a vast collection of such asteroids. These moving, like the planets, in a resisting medium, must approach the sun, and on showering down on the sun's surface transfer their motion into heat, thus maintaining the temperature of the sun, and therefore sustaining life on our planet, for "each drop of rain or flake of snow, each mountain streamlet or brimming river, owes its existence to the sun." It is by the power of the sun's rays that the waters of the ocean are lifted in the form of vapor into the air, and it is by condensation of this atmospheric moisture that every drop of running water on the earth's surface is formed.

Nor is this influence of solar radiation confined to the inorganic world; no plant can grow, and therefore no animal can exist without the vivifying action of the sunbeam. The animal derives the store of energy necessary for the maintenance of life from the force locked up in the vegetable or animal organism upon which it feeds; the food of the animal undergoes combustion or oxidation in the body, and the heat thereby evolved is converted into mechanical energy, so that the labor of the animal is subject to the same laws which regulate the work done by the steam engine, supplied with vegetable fuel. We see that the animal draws its store of energy from the plant. Where does the plant obtain the supply of energy necessary for its growth? The animal cannot continually gain power from the vegetable unless the latter has

as continual a supply. The source of power in the plant is found in the sun's rays. It is the sun's rays alone which enable the plant to grow, for the growth of a plant consists chemically of a decomposition or splitting up of the carbonic acid gas which exists in the air into its simple constituents—the carbon assimilated for building up the vegetable tissues and the oxygen being sent back into the atmosphere for the subsequent use of animals. To effect this separation of the particles of carbon and oxygen a very large expenditure of energy is necessary, and this energy is supplied by the sun. The rapidly vibrating solar rays are absorbed by the plant, and their energy used in tearing the particles of carbon and oxygen asunder.

Thus we trace trace the globe which we inhabit to vapor, from vapor to liquid, from liquid to an incandescent state, which geology indicates in the leaves of the earth's crust. This unmistakably points to a beginning of the earth's existence. How did all this arise? Here explanation is set at defiance; but it is where explanation seems set at defiance that the true student of nature is most hopeful of finding instruction. "Truth," says Faraday, "should be the primary object of the philosopher." The theist believes in a self-existent God, of whom he knows nothing. The Atheist in the eternity of matter, of which he knows a little. But, asks the theist, does materialism explain the origin of existence? No; nothing explains the origin of existence. Some kind of existence is eternal, therefore something is without an origin. All speculative thinkers agree that something exists which never had a commencement. No one believes that in the beginningless past there was an absolute emptiness. Ingersoll says that "nothing as raw material for creating a world is a failure." Though the word eternity has an indefinite meaning, we are forced to accept something as ever-existent. Where nothing is certain all is conjecture.

If the indestructibility of matter establishes the eternity of matter, and the various forms of energy are mutually convertible, if heat is nothing but motion, and if we can measure heat by common mechanical energy, if matter and motion explains all terrestrial actions, all life, all nature; if, as Tyndall says, "the solar ray forms the muscle and builds the brain," and the sun's heat is kept up by the showering down of asteroids and planets on the sun's surface, their motion being transferred into heat, the secrets of life are exhausted and mental as well as physical action are referable to a material standard. Experiment has established that the smallest degree of motion produces heat, which intensifies as the velocity increases. This powerful agency of motion may be sufficient to account for all the heat which is distributed through the universe. Proctor says, in his lectures on the growth of worlds, "When the sun gathers in matter from without, the velocity of the matter increases as it approaches the sun, calculated by all mathematicians the velocity would be infinite at the sun's surface." Matter being eternal and motion continuous, matter and motion would include all phenomena, and when an apparent destruction of matter takes place, matter is not destroyed. Recomposition commences, and evolution proceeds in an endless cycle of changes.

Many things having souls, have, in some instances, very small souls.—W. S. Bell.

The doctrines of the infidels rest not upon faith (which is only imagination), but upon real facts and demonstrated science—the only foundation that keeps any one upon "the safe side" and renders them guiltless of deceiving and hoodwinking their fellows, and perpetuating error, fable and mythology all down the coming ages, stultifying and dwarfing the intellect, and sowing the seeds of sadness, gloom, and misery, instead of those of hope, health, happiness, and knowledge. The Christian promises what he cannot give, what is not in existence nor can possibly exist. The Infidel promises the real and the tangible: the blessings of this world in all its fullness of joy and possibilities—Nature's free gifts to her children. Reader, which will you have?—Mrs. E. D. Stenker.

THE MOSAIC COSMOGONY.

BY O. W. GRIFFITHS.

(Continued.)

A press of work of various kinds, and some indisposition during the hot weather, prevented my continuing the "Mosaic Cosmogony" in time for the September number of the FREETHOUGHT JOURNAL.

Glancing over what has been already written, I felt confirmed in a suspicion I had begun to entertain, that I had committed myself to a criticism of an, after all, not very important article, so minute as to be likely to prove wearisome. I propose, therefore, not to follow the *Quarterly Reviewer* into much more detail, though several points might be made by doing so, but rather to lean to a generalization of the subject, which may I trust be rendered of some interest by the authorities which I shall quote.

I am, however, bound to advert to a remark I made in that portion of this article which appeared in April, *i.e.*, that "the *Reviewer* would be hard pressed to define his 'act of creation,' but that I would presently help him towards tracing the nebular vortex-ring to one act or point." I do not pretend to point out the initial act or point; simply to suggest a step towards it; and the suggestion is a very simple one. Every particle of matter attracts every other particle with a force proportionate to its mass, and every particle of matter has its own poles of attraction and repulsion. Now, I am myself but indifferently versed in the details of science, though that is a deficiency which does not by any means incapacitate from sound generalizations, or a broad grasp. It does not therefore present itself to my mind as a very difficult conception, that those two properties, should at any instant of favorable conditions, find themselves compelled so to interact on each other, as necessarily to induce the rotary motion on which all the subsequent developments would appear to depend, and none but an orthodox arguer would, at this stage of investigation, feel himself necessitated to resort to a "creative fiat" as the initiatory impulse.

We see that the orthodox argument is a strenuous endeavor to twist the very bald text of the so-called Mosaic documents into accord with the nebular hypothesis. It so happens that the vague grandeur of the record has afforded scope for some apparent possibility of dovetailing, though, as we see the joiners work will not stand a close inspection. If science should find cause to replace the nebular hypothesis with a newer theory, sacerdotalism would shortly succeed in stretching the first chapter of Genesis to cover that ground also, and I do not doubt that many such 'changes of venue' will take place, before the placidity of the flock will be disturbed by any doubt as to the shepherd's clearness of vision, and power of direction.

In the meantime it may be well to bear in mind that, although the nebular hypothesis fulfils nearly all the demands which, as yet, astronomical science sees its way to make of it, the retrograde motion of the satellites of Uranus warn us that we may not be standing on perfectly sure ground. It would be a ludicrous waste of orthodox endeavor at reconciliation should it hereafter be found necessary even to materially modify the present theory.

The ultimate object of the article from which I have quoted so much is, as against the assumptions of Geologists in favor of stupendous periods of time, to establish their improbability. As the lowest estimate the *Reviewer* can find authority (that of Professor Tait) for screwing down to, is "ten or fifteen million of years," it would seem that "*le jeu ne vaut pas 'a chandelle.*" If the sacerdotalists conceded ten thousand years only, it would upset the Mosaic literalism as effectively as ten millions.

The *Reviewer's* article, indeed, consists of two lines of argument—one to prove that the Mosaic record covers any number of eons of time that may be required by the chronic exigencies of the sacerdotal exegesis; the other to prove that, after all, the world did not take such a very long time to mature. Endeavoring to gain half an advantage from each position, one is impressed with the idea that either proposition goes some way towards neutralizing

the other. Like the dog who in the fable grasped at the shadow, he misses the substance, and falls between two stools.

At the foot of the first page, according to the custom of the *Quarterly* and other reviews, is a list of six works which furnish the materials for review. They are all geological. Other works are incidentally quoted, and indicated by foot-notes, but not the "Aids to Faith."

"Aids to Faith," was published about 1862, in answer to the famous "Essays and Reviews," and it is only fair to its contributors to admit that orthodoxy has since produced nothing better. The writers of the several essays are Professor Mansel of Oxford; Dr. Fitzgerald, Bishop of Cork, Cloyne, and Ross; the Rev. T. C. Cook, Prebend of St. Paul's; Professor Rawlinson of Oxford; Dr. Browne, now Bishop of Winchester; Dr. Thompson, now Archbishop of York; Dr. Eliot, now Bishop of Gloucester and Bristol; and Dr. McCaul, Professor of Hebrew, Kings College, London.

The tone and temper of the work besit the learning, the gravity, and the social position of the authors—grave, mild, and courteous, as well as marked by great ability and critical acumen, it is impossible not to recognize in it the hands of men better than their creed, though "tied and bound with the chain" of their zealous faith in inspiration, and weak as water to the preceptions of an unbeliever in the great snake story.

The *Quarterly Reviewer* must have found in it still more attractive qualities, for the chief reason of my mentioning it is, that about one-third of the whole article, including nearly all the quotations I have given, are extracted from it almost verbatim, and without acknowledgment. It would thus appear that a defender of the orthodox faith, writing in 1877, could find no more recent sources of support than published in 1862, a work which, however respectable, is now out of date. It is, indeed, eminently satisfactory to gather from such indications, that while the attack advances and strengthens from year to year, the defence if not retrograding, remains stationary.

(To be continued.)

MYTHOLOGICAL STORIES FOR THE YOUNG.

BY MRS. ELMINA D. SLENKER.

No. 6.—*Amphitrite.*

The biography of Mrs. Neptune is scant and meagre in its detail. Being only a woman, even though a Queen, she is thought to be of little account and worthy of little notice. She was born of good parentage. Her father was Nereus, a sea deity, the eldest son of Pontus (the sea) and Earth. He was distinguished for his knowledge and his love of truth and justice, and was called the Sea elder, and his daughters were Nereids. Her mother, Doris, was also an Oceaniad and the sister as well as the wife of Nereus. Amphitrite was the most notable of the fifty daughters of Nereus and Doris. Propertius makes them a hundred! Just think of it. Old Neptune surrounded at each family reunion with ninety-nine sisters-in-law! What a gathering there must have been in that palace under the sea. Only two children were born to Neptune and Amphitrite—a son called Triton and a daughter named Rhoda, but the children, as is usual with the godly line, had lots of half-brothers and sisters through the amours of their father Neptune, who, like his brother Jupiter, was fond of a pretty face. Triton was the trumpeter of Neptune, and terrified the giants in the war with the gods by the sound of his instrument, which was made out of a shell called concha. It was also blown at the command of Neptune to soothe the restless waves of the sea. The upper portion of Triton was like that of a man, and the lower part that of a dolphin. The island of Rhodes, which lies in the Mediterranean Sea forty-three miles from the main land, is named for the daughter of Amphitrite. It was on this island that she was seen by the sun god, who, captivated by her beauty, married her, and became the father of seven sons and

one daughter by her. The sons were called Holiadae, and, like their grandfather Nerous, they became celebrated for their learning. They were skilled in the sciences, invented astrology, taught the art of navigation, and divided the day into hours, &c. "The island of Rhodes remained from henceforth consecrated to the sun, and it continued ever after a favorite boast on the part of the Rhodians that not a day passed during which their island was not illuminated for an hour at least by the solar rays." It is said to be a delightful island—healthful in climate, and its gardens filled with delicious fruits, "while every gale is scented with fragrance from orange and citron trees, and aromatic herbs."

Thus much for Amphitrite and her descendants.

Snowville, Pulaski Co., Va., Oct. 3, 1878.

COL. INGERSOLL "ON SOME MISTAKES OF MOSES."

From the Boston Investigator of Oct. 23.

The lecture delivered by Col. Robert G. Ingersoll last evening (Sunday) in Music Hall, entitled "Some Mistakes of Moses," though nominally new, did not differ very materially from a lecture which he gave here last spring under a different title. The subject proved rather more attractive than that of his recent lecture on Robert Burns, and drew an audience of 2,000 people, the larger part of whom were evidently in hearty sympathy with the lecturer and his views.

I am often asked, he abruptly began, why I trouble myself about these matters. It is because I wish to free the public men of this country; because I wish to break the chains and tear off the manacles of the pulpit; because I wish every minister to stand, not as a teacher, but as an investigator; because I wish to free politicians from the necessity of being hypocrites in order to obtain office; because I wish the people to judge politicians by their deeds rather than by their professions; because I wish the politicians to be no longer like the center of the earth, attracting everything else to them, yet weighing not an ounce themselves. To have free government we must have free thought, and to have free thought we must abolish the slavery of the pulpit. [Applause.] Why, the professors of Andover have to make oath every five years that they will make no intellectual advancement for five years to come, and not one one of them ever committed perjury. Now every pulpit is a pillory, and every well-regulated church is like a cemetery, in which the members lie rotting side by side. We have sacred records, every country has them. If we had been born in Turkey we should have been Mohammedans and believed all the stories in the Koran. We should have believed that God sent eagles with stones in their claws to fly over the heads of an army and drop the stones upon them, and any one who denied this we should have been ready to persecute. Had we been born in India we should have believed in Vishnu and Brahma. Had we been born centuries ago we should have thought it our duty to offer up our children as sacrifices to a bloody God. Well, our sacred records are like all the rest. In them, mingled with some good, is an immense mass of superstitious rubbish. For my part, I do not believe that a miracle was ever performed. I believe that fire was always hot, that water was always wet, and that nothing more wonderful ever happened than is happening now before our eyes. If the books had been written to-day the foolish parts would have been left out. [Applause.] Am I to be punished for not believing them? Shall I suffer in another life for having been true to myself in this? If these records are a revelation, the revelation is to me as much as to anybody. If I don't understand it rightly, it is the writer's fault. I have wasted a certain amount of my time in reading those sacred records, and I wish you to waste a certain amount of yours in reading with me that portion of them known as the Pentateuch. Now, some people read these records in such a solemn frame of mind that they cannot possibly see the contradictions in them. When a man gets solemn, as a rule, he gets

stupid. [Laughter.] You should read the Bible precisely as you would read the Koran.

You must ask, is there an infinite being, and is this His will? If there is an Infinite Being, I take it for granted that He always know all about science, all about human rights, and as much about women as about men. If any mistakes have been made, they are the mistakes of infinite wisdom. I cannot imagine a Creator. I cannot conceive of nothing as raw as material. My mind is so constituted that I can only believe in infinite space, infinite time, and infinite matter. But setting this aside, let us examine the Pentateuch, which is said to have been written by a gentleman by the name of Moses. This I don't believe, for I cannot think it possible that any man wrote an account of his own death; but I will admit that he wrote it. In his account of the creation he says that God divided the darkness from the light. The man who wrote this must have conceived of darkness as an entity. He did not know that it is merely the absence of light. He probably imagined God throwing chunks of darkness on one side and beams of light on the other. He says, too, that God divided the waters under the firmament from those above it. He must, then, have looked upon the firmament as solid. He knew nothing of evaporation; he did not know how the clouds are made and how the rain is formed. These were mistakes of his. On the third day, as he describes it, everything was green before the sun was made. I do not believe that there ever was a green thing until the sun had shone upon it. Was not this a mistake? Next he tells us that God made the sun to rule the day and the moon to rule the night, and, though he came near forgetting this, that he made the stars also. This man evidently thought of the earth, not as the insignificant atom that it is, but as the centre of the universe, and that God set the stars in the sky merely because they were left over. Was he not mistaken in his astronomy? Then man and the animals were made. Milton tells us how the animals were moulded, but the method by which man was made out of the dust has never been revealed to us. We are only told that God made him male and female. But in a second account of the creation following closely upon this, man was made before the animals, and woman wasn't made at all. Then God caused the beasts of the field to pass before Adam for him to select a wife from, but Adam was suited with none of them, and I'm glad of it. So God had to make up for his oversight by making a woman out of one of Adam's ribs.

Just imagine an infinite God with a bone in his hands to start a woman with! And yet if you refuse to believe all this you will be damned hereafter. Unless you swallow it you are in danger of hell-fire. If you can't understand it you must have faith and look solemn. [Laughter.] The lecturer criticized the readiness of modern Christians to believe even the most outrageously improbable stories of the Bible, and asserted that heresy has in it no such element of stupidity. He expressed his disbelief in many of the miracles of the Old Testament, and asserted that the laws and facts of Nature were in those days as unalterable as they are to-day. Nothing more wonderful occurred then than happens in our midst to-day. After alluding to the violation of all laws of Nature, science, geology, and astronomy in the account of the construction of the world, and the alleged destruction of the latter, and its contents by water, he added that, if the Bible were to be written to-day, a great many foolish things would be left out. The obscurity of certain portions of the Bible and the apparent variance which exists in various instances afforded the lecturer an opportunity for "making points," which he did not fail to improve, to the evident delight of his audience. A great many people, he said, when they sit down to read the Bible, put themselves into such a frame of mind that they cannot see a contradiction in it. When they get solemn they invariably get stupid. [Laughter.] In referring to the Pentateuch, he claimed that many of the events alleged to have been narrated by Moses occurred so many years after his own death as to render the Bible, as a history, a fraud. The lecturer laid particular stress on the creation of the heavenly bodies, as briefly detailed in Genesis—"and he made the stars also"—and

his comments on the alleged astronomical inconsistencies were received with evident approval and enjoyment.

The creation and the fall of man, the embarkment of Noah and his family and the animals, the flood and the career of "God's chosen people" were next considered. The concluding portion of the lecture was devoted to criticism of the Deity and to the arraignment of the God of the Hebrews on charges of cruelty, treachery and immorality. His ideal of a God was a being whose attributes are mercy and justice. The God of the Jews approved of polygamy, slavery, rape, and rapine. Why were we so disgusted with Brigham Young when he but followed many of the teachings of the Old Testament and the instructions of the God of the Hebrews? The Bible was the auction block on which stood every man and woman sold into slavery. The Bible opposes religious liberty; it upholds murder, and calls the chief of murderers a man "after God's own heart." The man after his own heart was he whose motto was, "Malice towards none and charity for all." [Great applause.] The lecturer made a telling point by contradicting the Bible sentiment which implied that labor is a curse. He concluded his somewhat rambling and disjointed lecture by calling on his hearers to educate their children according to the truth as they understand it, to the exclusion of fables and impossibilities. The truth is before us; here are justice, charity, love and liberty. Put behind you the books in none of which can those attributes be found. Help to break the chains of the clergy, and inspire them with courage to speak out the truth.

WHAT SPIRITUALISTS BELIEVE.

BY WILLIAM EMMETTE COLEMAN.

Spiritualists have no formulated creed, but each is privileged to accept or reject all things presented him, no matter whence their origin. No two Spiritualists believe precisely alike; but there are certain statements of doctrines in which nearly all Spiritualists profess belief, and these I shall now summarize:—

1. Spiritualists believe in the eternity, uncreatability and indestructibility of primordial substance. Some Spiritualists regard matter—that is, matter perceptible to the physical senses—as evolved from spirit, the eternal uncreated substance; some think matter and spirit co-eternal and co-united; while some deem spirits an evolution of matter,—by spirit being understood, in each case a more sublimated and ethereal form of matter. The eternity of substance, material or spiritual, or both, is ever predicated by the Spiritual Philosophy.

2. Spiritualists believe in evolution, from everlasting to everlasting. The material universe is the product of evolution from the primeval nebular; and, in like manner, the spiritual universe has been evolved from spiritual substance. Material worlds are technically termed, First Spheres; emanations from these—spiritual essences—form spiritual worlds, or Second Spheres; emanations, or refined essences, arising from the Second Spheres form Third Spheres; and so on indefinitely. Some Spiritualists believe in an infinite succession of spheres, while others are convinced of the existence of a Perfected or Deific Sphere, in which all knowledge and virtue are compassed by the indwelling minds, said minds constituting the only personalized form of Deity in the Universe:

3. Spiritualists believe in material and spiritual counterparts,—all material atoms and forms being animated by corresponding spiritual atoms and forms; that, upon decomposition of forms, the spiritual essences thereof arises therefrom, and if of a higher grade they gravitate to the second Sphere, but if of lower grade they re-animate other material forms. The Second Sphere is, therefore, an improved and beautiful world, diversified with land and water, earth and sky, hill and vale, flora and fauna, men and women, towns and cities, schools and laboratories, museums and theatres, books and newspapers, rural cottages and stately mansions. Man's spirit-body is the analogue of the material body, with his powers and functions increased and expanded. The

Second Sphere has twelve circles, corresponding to stages of moral growth; and at death each spirit, by natural laws of attraction, gravitates to that circle to which it is attuned. All spirits, however, eventually progress in wisdom and virtue from circle to circle, rising higher and higher at each successive step; every human being in turn attaining the same exalted destiny. The development of the lower spirits is assisted by instructions and ministrations from those higher than themselves; millions of philanthropic souls being engaged in this goodly work. Spirits passing from the twelfth circle of the Second Sphere to the first of the Third Sphere leave behind their spirit-body,—by a process analogous to physical death,—and assume a higher spirit-body; and so from Sphere to Sphere.

4. Spiritualists believe in the intercommunion of the material and spiritual worlds; that all persons on earth have guardian spirits, generally relatives or near friends, who strive, as far as nature's laws permit, to benefit and improve their wards; that their presence may at times be manifested to those on earth by physical phenomena demonstrative of the operation of unseen intelligences, or by mental or psychological phenomena, in which an intelligence foreign to the mind through which it is projected is displayed,—in some instances the intelligence being manifested through so-called materialized hands and arms, head, and whole bodies, temporary embodiments of pre-existing material elements used by the unseen spiritual visitants to demonstrate their power and actuality.

5. Spiritualists believe in inspiration and intuition; that the mind in exalted states of consciousness is receptive to truth flowing from the inner fount of causation, or becomes inspired; that it is possible for spiritual things to be discerned by the clairvoyant eye, and for material things to be seen and heard without the intervention of the material eye and ear, the most striking examples thereof being observed in the eventful life of the marvel of the nineteenth century, Andrew Jackson Davis.

6. Spiritualists, in general, are rather Pantheists than either Atheists or Theists, the Divine in nature or the universe being recognized as ever immanent; the material universe being the body of Deity, and the spiritual universe his (or its) soul. Man's intelligence is deemed a drop from the Infinite Ocean of Intelligence, and will attain Deific proportions and perfection.

7. Spiritualists believe in the supremacy of law, to the exclusion of all miracles and supernaturalism. All things, material and spiritual, are governed by immutable law, incapable of being transcended and annulled; and all so-called supernatural events—when genuine—are the result of natural laws, the action of which is not as well understood as some others. No more miracle attaches to a chair being uplifted to the ceiling by unseen spiritual hands than when lifted by a natural hand. The counteraction of the law of gravitation is occasioned in each instance by the intervention of an intelligent human personality, acting by due process of law.

8. Spiritualists, as a class, regard the Bible as a finite, fallible production, to be judged, like other books, solely upon its merits and demerits. Some regard it as a record of spiritual manifestations in ancient times, and so of use as confirmatory of the modern. Nearly all reject the claim that it is, in any special sense, the Word of God. Some few Christian Spiritualists in America, and a large number in England, still, however, revere it as a revelation from God to man.

9. Spiritualists look upon Jesus as a natural man, nothing more,—a Jewish reformer, possessing probably some mediumistic or clairvoyant powers,—and no more the Saviour of the world than Voltaire or Paine, Socrates or Buddha. Some few Christian Spiritualists place a higher estimate upon him, considering him as, in some inexplicable manner, the son of God.

10. Spiritualists are nearly all Freethinkers, believing strongly in free thought, free speech, and a free press; in the complete secularization of the government; and in the complete emancipation of the human mind from sectarian creeds and dogmas, superstition and fanaticism. Some Spiritualists, though, are as superstitious, as credulous, and as dogmatically intolerant in their spiritual notions as any churchman could well be.

11. Spiritualists believe in the per-se morality, the highest ethics. The code of morals found in the works of Davis, Tuttle, and others has never been surpassed in its far-reaching comprehensiveness, its devoted self-sacrifice, and its philanthropic persuasiveness. Spiritualism teaches, that, as every infringement of physical law carries its punishment with it, so every violation of moral law inevitably brings its punishment either in mundane or supermundane life; and from this there is no escape. Our condition in spirit life depends upon our moral status, and our progress and our consequent increased happiness in the spirit-world is involved in our moral improvement.

12. Spiritualists believe in the universal and eternal progress of mind and matter; they encourage and emphasize the importance of the reformatory movements of the world,—of everything calculated to benefit mankind, mentally, morally, physically,—of all achievements in the domains of science, art, industry, music, poetry, etc. Spiritualists may ever be found busily active in the furtherance of womens' rights, peace and temperance, labor reform, social and prison reforms, hygienic and therapeutic reforms, and similar humanitarian labors.

This is a simple outline of a few of the more prominent beliefs of the Spiritualist; many important points are omitted from lack of space. Those presented will serve, we think, to give a tolerably clear and definite idea of what Spiritualism, in its higher phases, really is.

Fort Leavenworth, Kansas, U. S. A.

EXTRACT FROM A LECTURE ON "THE ORIGIN OF ORTHODOX RELIGION."

BY CHARLES ELLIS.

While we look at primitive man as a religious animal, we are in reality only contemplating a being so entirely subject to phenomena external to himself as to be almost if not entirely an unreasoning being, and therefore an irresponsible one, as far as any duty might have devolved upon him by virtue of his supposed possession of a moral nature and his allegiance to a supposed God. And yet it is undoubtedly true that religion and theology had their origin in this early, savage, ignorant, unreasoning condition of human life. The fierce lion that crouches in fear at the feet of the tamer could rend him as easily as he could a weak defenceless calf, did he but know the weakness of the being who controls him, but through fear the lion sees in man what the ignorant man sees in "God." As has been truly said:—

"Fear hath the devils made,
And weak hope her Gods."

But the Gods also have been objects of fear because upon their will alone has ever depended the activity of the devils. And the whole brood has been hatched under the brooding wing of uncultivated emotion.

By cultivating the fear which men had of the "Supernatural powers" which imagination had created to explain the phenomena which they saw everywhere around them, there was created in time an opportunity or the existence of persons whose business should be to study the wills and wishes of these supernatural powers, and by making them known to man thereby prepare the way for a possible and continual propitiation by reward or worship. This opens the way for the priesthood, and out of it comes the vast systems of theology that have grown like huge "Black Forests" over the fair surface of the human world.

It must have taken many thousands of years to evolve, in the crude minds of early men, sufficient power of observation, speculation, analysis and synthesis to produce a clear satisfactory knowledge of the causes of even the most common natural phenomena, as, for instance, the recurrence of day and night. We can by no reported or supposed miracle convince ourselves that man appeared upon the earth an educated and perfected animal, as orthodoxy teaches, nor can we any more easily convince ourselves that he passed suddenly from a savage to a civilized condition.

"An instantaneous adult, like an immortal animal, is an absurdity." And the spontaneous generation of human mental perfection is equally absurd.

It follows, then, that man's growth must have been long, slow, lowly, toilsome * often painfully severe. No benevolent personal God stood ready to elevate him by special providences and miracles. No schoolmaster was abroad to receive him; no Universities opened their arms to lead him on. He was the original Topsy—he "just growed up!" But as he grew from age to age, his wonder could not cease to centre upon the vast illimitable mystery around him. What? How? Why? were questions that forced themselves upon his bewildered mind, and sprung upon him at every turn. Not one mystery could he solve, and the whole universe pressed him to answer her riddle. What wonder, then, that, subject as he was to wonder, awe and fear, he took counsel of his fears and sought in every action to palliate the fierce powers that his crude mind saw in every phenomenon of nature? What wonder that it became a paramount duty to propitiate the powers, spirits or gods that his unsatisfied curiosity and fear placed in every tree, stone, or star before him? Obliterate all knowledge to-day and remand the human race to that primitive barbarism that was the birthright of our progenitors, and our offspring will once again establish that lowly religion of emotion—the worship that grows naturally out of ignorance and fear.

[Mr. Ellis will answer invitations to lecture. Send to him for circular, at No. 8 Portland St., Boston, Mass.—Ed.]

THE WISE MEN OF THE EAST.

The Chinese astronomer's ways are curious and past understanding in these Western lands of science. It is related that in the fifth year of the present year the learned men of Peking noticed that the sun did not shine as bright as had been its custom. Instead of being clear it had been to them a red and lurid light. The weather was dry and the sky covered with a mist. Turning to their scientific books the learned men saw with amazement that the signs, by all the laws of science and antiquarian knowledge, gave warning of danger to the Imperial family. The tidings were promptly carried to the throne. Orders at once went forth for the defense of the residence. The gates were defended by soldiers, and the line of wall zealously guarded. A panic spread among the people. Something was about to happen to the Emperor, they said, and what it was no one knew.

To allay the disquiet and to end the questions that were pouring in upon them, the authorities at once said, the Government was on the brink of a war with Russia. Some trifling discussion between Russia and Chinese authorities in central Asia gave color to the report. But suddenly the illusions were dissolved. At the imperial household one day joy was awakened by the first appearance on the stage of history of his Imperial Highness, the Fifth Prince. Thereupon the wise men of the East returned to their books to see where they had made their blunder. It was laid down they learned that the evil influences of a crimson sun and lurid sky were averted if rain should fall within five days after their first appearance. Of course rain had fallen.—*Exchange.*

The Chinese ways may be "past understanding," but not more so than the ways of some persons in these "Western lands of Science," who pretend that certain events verify the senseless ravings of the "prophets of old,"—ED. JOURNAL.

YELLOW FEVER.

It is curious, in this age of science, that the cause of yellow fever, its remedy and prevention, have not yet been found, while almost all other diseases are more or less under the control of doctors and medicine. (If there could be such a thing as a Divine revelation for the cure and restraining of yellow fever, or if "spirits" had the power to effect this very desirable result,

what a great blessing such a revelation and such "spirits" would be to mankind! We suggest to our Spiritual friend of the *Banner* the deliberate consideration of this idea, to the end that "spirits" may be as useful as possible.)

Yellow fever seems to prevail only in certain localities—the West Indies, Venezuela, New Grenada, Mexico, and the southern part of the United States. We hardly hear of it elsewhere, except, perhaps, some part of Africa. It belongs to tropical climates, is almost exclusively a disease of cities, and usually disappears after the first frost in autumn. Colored people are seldom attacked by it, nor are butchers, painters, and others who work in the midst of foul odors; but cooks, blacksmiths, and persons working near a fire, seldom escape an attack. These are curious facts, but not one of them are so important as this: that the first outbreak of yellow fever never takes place in a city where due regard has been paid to cleanliness and good ventilation. The fever may spread—though it rarely does so—to a clean city, but its birthplace is in filth. This teaches the useful lesson that any city may avoid being the means of starting the pestilence on its round of death, and increases the responsibility of those cities which neglect the proper precautions.

The best theory of the cause of the disease is that it is the development of a living organism, which has yet escaped detection by the microscope. It is supposed that the germ, the egg, or the seed, of this organism is present in the water or the soil of places in the infected territory, and that it is developed by the combined effect of decomposing filth and heat, after which it attacks human beings and multiplies in them.—*Boston Investigator*.

CASKET OF GEMS.

A smile costs the giver nothing, yet it is beyond price to the erring and repentant, the sad and cheerless, the lost and forsaken. It disarms malice, subdues temper, turns enmity to love, revenge to kindness, and paves the darkest paths with gems of sunlight.

For ages, a deadly conflict has been waged between a few brave men and women of thought and genius on one side, and the great, ignorant religious mass on the other. This is the war between Science and Faith. The few have appealed to reason to honor, to law, to freedom, to the known, and to happiness here in this world. The many have appealed to prejudice, to fear, to miracle, to slavery, to the unknown, and to misery hereafter. The few have said, "Think!" The many have said, "Believe!"—*Col. Ingersoll*.

There is no trifling with Nature; it is always in the right, and the faults and errors fall to our share. It defies incompetency, but reveals its secrets to the competent, the truthful and the pure.—*Goethe*.

Give me the storm and tempest of thought and action, rather than the dead calm of ignorance and faith! Banish me from Eden if you will; but first let me eat of the tree of knowledge!—*Ingersoll*.

The ignorant and unthinking have no idea beyond the present, the now and to day: so they say, "Eat, drink, and be merry," but as we trace the effect of moral and intellectual culture upon the mind of the individual and of the race, we perceive a gradual evolution of the grander and higher nature which makes provision for the future, which gathers and hoards up sustenance for the subsequent needs of body and mind: which looks forward to the future welfare and happiness not only of self, but of the family and of the whole coming race, and builds and plans in consideration thereof. These wider and broader views increase and grow in proportion as we evolve from the plane of a lower into that of a higher civilization.—*Mrs. E. D. Stenker*.

Be intolerant of nothing but intolerance.

It is with us a matter of regret that the people are yet so unadvanced, that the clergy are permitted to divert many of our insti-

tutions of learning from their true and legitimate objects, making them mere theological mills from which the students, after going through the usual routine, come out, not fully educated men with broad, cosmopolitan views, but men, sectarians and bigots, dwarfed in mind, and with distorted and false views of scientific, philosophical and religious subjects.—*B. F. Underwood*.

Truth, considered in itself, and in the effects natural to it, may be conceived as a gentle spring or water source, warm from the genial earth, and breathing up into the snow-drift that is piled over and around its outlet. It turns the obstacle into its own form and character, and as it makes its way, increases its stream, and should it be arrested in its course by a chilling season, it suffers delay, not loss, and waits only for a change in the wind, to awaken and again roll onwards.—*Coleridge*.

As for our miseducation, make not bad worse; waste not the time, yet ours, in trampling on thistles, because they have yielded us no figs. Here are books and we have brains to read them; here is a whole earth and a whole heaven and we have eyes to look on them.—*Carlyle*.

It were not perfect hell, if any hope could lodge in it.—*Bishop Pearson, on the Creed*.

[Truly spoken, oh most learned bishop!]

He who can think dispassionately and deeply as I do, is great as I am; none other. But his opinions are at freedom to diverge from mine, as mine are from his; and indeed on recollection, I never loved those most who thought with me, but those rather who deemed my sentiments worth discussion, and who corrected me with frankness and affability.—*Landor's Imaginary Conversations*.

In the darkest hour through which a human soul can pass, whatever else is doubtful, this at least is certain: if there be no God and no future state, yet, even then, it is better to be generous than selfish; better to be brave than to be a coward.—*F. W. Robertson*.

No soul is desolate as long as there is a human being for whom it can feel trust and reverence.—*George Eliot's Romola*.

The simple believeth every word, but the prudent man looketh well to his going.—*Solomon*.

Religion in Italy has no necessary connection with any one virtue. The most atrocious villain may be rigidly devout, and, without any shock to established faith, confess himself to be so.—*Shelley*.

Dante's assertion that the majority of mankind are born "only to manure the earth," and Carlyle's that England contains so many millions of inhabitants, "mostly fools," are not very flattering to our vanity, but they nevertheless represent one side of a very important truism.

The first exchange to be made between man is an exchange of good sentiments and of good offices.—*Edmund About*.

Colonel Ingersoll thinks that it is too bad to make so much fuss about original sin while so much copy remains.—*Ghosts*.

"All for Christ" is a very good motto for Y. M. C. A.'s, but, to bring out the full truth, they should add, "except a good deal for ourselves."

He who speaks most of himself is the greatest liar.—*Chinese Proverb*.

Evolution is slow, continuous, and imperceptible. What intelligence has a child ere it is born, or immediately after birth? It has a capacity for intelligence, but the mind is perfectly blank: yet intelligence is evolved by its circumstances and surroundings. There is no apparent life or intelligence in a seed or an

egg, yet a dead seed or a lifeless egg will not germinate. The egg has no intelligence, but the bird or fowl hatched from it has. Where does it come from if it be not evolution from the matter composing and surrounding the living existence? We know nothing of the spontaneous generation either of life or intelligence; germs of both are found everywhere, in air, earth, and sea, but there is no sudden leap from matter to mind, or from matter to organized forms of life. If there was a time on earth when life was not and intelligence was not they must have been evolved from matter which already existed on the earth, or have been extraneously created by some power outside of matter and of such power we have no knowledge whatever.—*Mrs. E. D. Slenker.*

I venture to assert that the exercise of private judgment, faithfully gone about, does, by no means, necessarily end in selfish independence, isolation; but rather ends necessarily in the opposite of that. It is not honest inquiry that makes anarchy, but it is error, unsincerity, half-belief and untruth that make it. A man protesting against error is on the way towards uniting himself with all men that believe in truth.—*Carlyle.*

An elevated purpose is a good and ennobling thing, but we cannot begin at the top of it. We must work up to it by the often difficult path of daily duty—daily duty always carefully performed.

The victims of fanaticism outnumber those of every other and all other passions that have wasted the earth. Pining in dungeons, hunted like beasts of prey, stretched on the rack, affixed to the cross—their sufferings are the horror of history. No high-wrought fiction, recounting imaginary woes, can match the colors of their authentic tragedy. A corruption of the text of the Vedas has cast thousands of Hindu widows alive on the funeral pile. An interpolation of two words in the service of the Eastern Church has driven whole villages in Russia into a fiery death. A sentence in the book of Exodus has been a death-sentence to millions of hapless women, and who shall compute the sum of the lives that have furnished the holocausts of the Inquisition?—*Hedge's Ways of the Spirit.*

COMPARATIVE EVOLUTION OF THE LOWER ANIMALS AND MAN.

(Concluded.)

BY WILLIAM EMMETTE COLEMAN.

(Based upon Gunning's Life History of Our Planet.)

THE HANDS OF MAN AND ANIMALS.—Comparing the Man-like Ape with Man, one is impressed with the all-pervading similitude. Differences there are, as in the size of the brain, the form of the head, proportion between the limbs, and generally in the form and finish of the parts; but they are such differences as lie between different men and different races of men. Gorilla's hand is composed of the same anatomical elements as the hand of Man, and the likeness is carried out even to the finger nails. The fingers are shorter and the palm longer than in man. But now and then, in the lower races, a man appears with a hand which approximates very near to that of a Gorilla. Man being the highest Mammal and the Australian Duck-bill the lowest, the two are separated by the whole height of the column of Mammalian life. The Duck-bill in the totality of its structure stands nearer the common, primary form of Mammals than any other living species. Look at its hand! It consists of three parts,—a wrist composed of two cross rows of bones, a mid-hand composed of five long bones, and five digits composed, the first of two bones, and the others of three. All these elements are enclosed in a fleshy web. The hand of the Mole is composed of the same elements as the Duck-bill, but the bones are shorter and stronger and packed more closely together. In the Mole the hand has become a shovel for digging. In the hands of the Seal the bones

are longer and more slender; and a fact worthy of note is, that while the thumb has become the longest digit it still retains the typical number of bones, being composed of two bones, while the other digits have three. In the Seal's hand has become a kind of fin. In the hand of a bat we find the same bones placed in the same relation, but drawn out, all except those of the first digit, into long and slender rods. In the Bat the hand has become a sort of wing. In the hand of the Potto, one of the lowest of monkeys, we have the same elements in the same relations, but very strangely the index finger has become atrophied. It is reduced to a mere vestige, *although not a bone has been dropped.* When clad in flesh the hand of the Gorilla is extremely unlike the primitive hand of the Duck-bill, but in the form and disposition of the bones it approaches nearer this pattern than any other of the series. Finally, we have the hand of Man, with not one bone the less, not one the more, not the least change in the number of its elements, and not the least change in their disposition! And of all these hands the human is that which, in its osteological structure, approaches nearest the old-fashioned, the undifferentiated hand of the humble Duck-bill! And why should it not? The Mole has made a specialty of digging, the Seal of swimming, the Bat of flying, and the Monkey of grasping. Man has not been a specialist. He alone has been *polytechnic*; and his hand could not be modified for any special purpose without danger to the other uses.

If any one insists that these types are not modifications of our primitive type, but special and independent creations, let him explain the atrophied index in the hand of the Potto. Did the Creator form the Potto directly from the elements, or from "nothing at all," with an atrophied forefinger? Being Purpose itself, why did he create the purposeless? Being Wisdom itself, why did he create the meaningless? And let him explain why organs so unlike as the paddle of the Mole and the wing of the Bat are yet so near alike in their beginnings. Let him explain why structures so nearly identical should be masked under forms so diverse as the paddle of the Mole, the fin of a Seal, the wings of a Bat, and the hand of a Man. *Was the Creator so poor in resources?* To all these questions science can render a simple answer. Her answer is in two words, *inheritance and adaptation.* By inheritance the primitive Mammalian structure is retained in the embryos of all Mammals, and in the adults of the six classes herein mentioned and of others not described. By adaptation the organ based on this structure comes to assume different forms for different uses.

LINEAGE OF THE HUMAN FOOT.—The history of the foot is as significant at that of the hand. The two extremities begin alike. When Man has been in the making only seven weeks you can hardly tell his foot from his hand. If he were born then, you might designate his extremities *fore-foot* and *hind-foot*. In the lower Mammals the extremities are all *feet*, fore and hind, and they are all used as organs of locomotion. Where the fore-limb begins to take in other functions than those of locomotion, we find it with corresponding modifications. As we ascend in the scale of life we find the fore-limbs given more and more to the service of the head. In Man these limbs are emancipated from the function of locomotion and given over entirely to the service of the mind. They are no longer legs, but *arms*; and their extremities are no longer feet, but *hands*. Extreme differences in use have resulted in extreme differences of form. The thumb is separated from the fingers. The big toe is not separated from the other toes, but is in line with them. The fingers can be moved each independently of the other; the toes must move altogether or not at all.

The lowest and oldest order of Mammals save one is the Marsupial, represented in North America by the Opossum. Its habits being partly arboreal, its feet have been modified for climbing. The fore-foot has not been differentiated from the hind, but both have been modified from the general pattern. The first step toward a hand has been made, but it is a step leading to the Quadrupeds, the *four-handed* order. But while the big toe has become a sort of thumb, the other toes have

not become fingers, but remain communal in their movements. From the Opossum we ascend through the Lemurs, or Half-apes, to the Apes, finding in all the tribes the same aboreal habits, and essentially the same modifications of foot. In the Apes the process of *hand-making* is carried further than in the Opossum, and the two have become more or less independent in their powers of motion. In the higher Apes, and especially in the Gorilla, the fore-foot is almost as much a hand as in Man, and the hind-foot is left almost as much a foot as in the Opossum. The human foot sustains to this history a relation full of significance. The position of the human big toe in embryo is adapted for prehension; and seems to be a reminiscence of a remote ancestral toe so formed and placed as to be useful in climbing. On the palm of the hand is a muscle called the *palmaris*, which is used in clasping. On the sole of an ape-foot is a corresponding muscle called the *plantaris*, useful in the same way, for clasping and climbing. On the sole of the human foot the same muscle occurs as a vestige, while now and then, and especially among the lower races, it is found large enough to have a function. It seems to be the reminiscence of a *plantaris* which, in some remote arboreal ancestor, flexed the sole of the foot as the *palmaris* flexes now the palm of the hand. In that man-like Ape, the Orang, Dr. Barnard, of Cornell, has found a muscle whose homologue has never been found in Man. In Orang it occurs as a vestige,—has almost faded out. It occurs in the lower Apes and in the Half-apes, but always as a vestige having no functional value. It appears again in the Opossum, but no longer as a vestige. Thus a muscle which is obsolete in man, almost obsolete in the higher Apes, less aborted in the lower Apes, still less aborted in the Half-apes, is found in the Opossum with its functional value. These facts are significant, are indicative of the lineage of the human foot and limb.

MAN'S DENTAL AND DIGESTIVE SYSTEMS.—As limbs in their beginnings are alike, so, in their beginnings, teeth are alike. From likeness they grow to unlikeness, and separate into molars, canines, and incisors. The molars are modified for grinding, the canines for tearing, and the incisors for cutting. In the Apes the canines protrude beyond the others, and appear in their typical character as flesh-tearers. In the male Gorilla they are developed into great fighting tusks. In Man their office is not fighting but masticating. Their crowns do not project beyond those of the molars or incisors. Nevertheless they are true canines, and their character as such has been clearly demonstrated by Owen; and demonstrated still more closely by themselves, as they take on, now and then, in the lower races, the character of tusks. These facts indicate the lineage of the human teeth. They show that Man's teeth, like his feet and limbs, were developed in some ancestor into greater differences from the primitive formula, and that they are now in a state of reversion toward that formula.

If the dental system has had a history, so has the digestive, for they are in correlation. In general, as the food of an animal is more concentrated, the intestine is reduced; as it is less concentrated, it is enlarged. To secure the greater expanse of surface exposed to the ducts which extract the nourishment of less concentrated food, there is a branch from the intestine called a *cecum*. In the Marsupials and Beaver this branch is very long. In the Sheep, which lives on anything in the way of grass, it is long. In the Cow, which is a little more fastidious of her grass, it is not so long. In the Carnivora, whose diet is the most concentrated form of nutriment, it is shortest. As a species, in the course of its history, changes, little by little, from less concentrated to more concentrated food, this part of the intestine contracts little by little. A shortened part of the intestine is indicated by a vermiform, or worm-like, appendix. This appendix is a closed sac, and is not only useless but injurious. In the Orang it is longer and more convoluted than in Man, indicating a greater reduction of the cecum. In Man it is variable in size and position. Sometimes it is entirely absent; sometimes it appears as the merest vestige; sometimes it is six inches long; sometimes it is open through its entire length and closed only at the top. If it were an essential part of Man it would always be present. If it were

not essential, and Man's body came directly from the Deity with all its parts adjusted at once to their functions, it would never be present. That it is sometimes present and sometimes absent, sometimes long and sometimes short, sometimes closed and sometimes open, is proof that is absolutely useless. It is worse than useless, it is positively hurtful. Little seeds sometimes drop into it, become impacted, and cause inflammation and death. In the light of comparison the vermiform appendix, though useless, is significant. It registers the reduction of the branch of the intestine from some ancestor whose diet and habit were different from those of Man.

THE EAR, MOUTH, AND EYE.—In the early embryos of the Reptile, Bird, Dog, and Man, the ear appears almost exactly as the eye, except that in the first two the eye is larger. In the more advanced embryos the ear has almost faded out, and in the Bird and Reptile a mere trace of its position is indicated. In the adult Bird and Reptile no ear is apparent. A little external ear is apparent in the more advanced Mammalian embryos, but in their earlier stages no one can tell which is the forthcoming human and which the animal, so similar is their appearance. When, however, the ear is finished it is usually pointed and movable in the animal, and is always rounded and almost always immovable in Man. The animal pricks its ears, turns them hither and thither to gather up the sound when it dreads the approach of a foe. Man, or the ancestor of Man, used to do the same thing; for he retains the muscle which moves the ear, although he has lost control of it. Now and then, though, a man appears who has not lost command of this muscle. The vestige of a point appears in many ears, indicating that the ear in some ancestor was pointed. It is evident that Man's ear, as at present, is not the original edition.

In all embryos the mouth is late in coming. The eyes have come; the ears have come; heart, stomach, intestines are defined; all the great systems are established,—while as yet there is no mouth. The mouth, also, does not begin in the right place for a mouth. In a few fishes only, and these of ancient pattern, does the mouth retain through life the position it first assumes in embryo. In the embryos of the Fish, Reptile, Bird, Dog, and Man, the mouth lies just in front of the first pair of gill-arches, and it rises simultaneously with them. In all vertebrates except Sharks, Rays, and Ganoids,—the lower fishes,—the mouth moves forward and upward from the gills, or the position of the gills. In all vertebrates it opens on the ventral sides. Dr. Dohrn, a distinguished German naturalist, has framed a strong argument, from the belated coming of the mouth and from its first position near the gill-clefts, that the mouth which now is is not the mouth which used to be. The present mouth, he argues, existed once with the functions of a gill, while another mouth of the early vertebrate opened on the surface which corresponded to our dorsal surface. Traces of this ancient mouth he finds in the fourth ventricle of the brain, which is remarkable for its great size in the early embryo and its subsequent retrogression.

In all vertebrate embryos the beginnings of the eye are small. It begins alike in all Mammals as a little blister on the skin. The upper layer of the skin rises, and the lower sinks into a little pit. The perfections of the eye have long excited the admiration of the devout; its imperfections now begin to challenge the investigation of the scientific. As an optical instrument the human eye is shown to have seven defects. If we were regarding it as an optical instrument made by a human intelligence, we should say that some of the defects were due to imperfections in the material. Seeing defects due to the matter in which "the idea" is expressed, Man might say that the eye is the direct creation of an intelligence which wrought under the same limitations as our own. Seeing defects inherent in the idea itself, he is constrained to say that the eye is not a direct manifestation of the All-wise and All-seeing. Noting the presence of a little structure which is perfectly useless and meaningless, he is led to ascribe to it an historical value. It is the vestige of a structure which has functional value in older eyes than ours. In the eyes of the shark, which represents the oldest class of fishes, we find a third eye-lid,

called a "nictitating membrane." This membrane appears in many Reptiles, which got it from the Fish, and in many Birds, which got it from the Reptiles, and in the Duck-bill, which stands near the horizon line where Reptile and Bird and Mammal meet, and in the Marsupials, which were an outgrowth from the order of the Duck-bill. It is not strongly developed in the Marsupial, and in the Ape it has lost its functions and is reduced to a vestige. In Negro and Australian men it is reduced a little more. In the higher races of men it is reduced still more. In Man it appears as a "semi-lunar fold." Man has received his eyes, as well as his hands and feet and limbs and teeth and ears, by inheritance from a long line of ancestors.

THE BODY OF MAN.—Man's body is a library of anatomical history. Many animals have developed a system of muscles by which they twitch the skin. Remnants of the twitching muscle appear in different parts of the human body. On the forehead they are efficient. On the neck they are well developed, but not efficient. In other parts of the body they are reduced to mere vestiges. They are heirlooms handed down from an ancestor who scratched less and twitched more than Man does to-day. Every useless part, every hurtful part,—and perhaps all that is useless is hurtful,—must be regarded as historic. Sir William Gill, the great physician of London, has lately raised a cry against the tonsils. Man, he assures us, would be much better off without tonsils, as useless parts are liable to disease. More of the past is inscribed in man's body than was written in the burned Alexandria Library. Of genuine Apes two families were evolved: one with narrow nose, is the Catarrhine Ape; and the other with wide nose and prehensile tail, is the Platyrrhine Apes. The first family was evolved in Asia and Africa, and was potential of higher unfoldment; the second was evolved in America, and like so many other American types its development was arrested. Man was to come, not in America, but in Asia and Africa.

The brain of Man contains not a vestige to show that it ever was or could have been in a higher state of unfoldment than now. Its servant, the hand, contains not a vestige to show that it was ever more supple or more polytechnic than now. Its index, the eye, contains a single vestige which shows that once it was not as now, the illuminating window of a soul, but a cold, passionless, nictitating organ, like the eye of an owl. The animal within us has declined and is declining. The soul within us has advanced and is advancing. If our organism varied so far from the average of its race as to have a mind able to contrive advantages for the body, creation will push forward the intelligence; and in proportion as that cares for the body, nature will drop her own special furnishings. So arose and advanced the Man, and so declined in his body, the structures which had equipped the animal. When Man armed his hand with a club, the canine with which Nature had armed his mouth, falling into disuse, began to abort. When he stripped the skin from an animal and wrapped it around his own body, the hair wherein Nature had clothed him began to fade out. When he left off arboreal life, the pectoral muscle and prehensile toe which Nature had given to his foot began, the one to abort and the other to undergo the modification which made it a fulcrum to aid in sustaining an upright body. The vermiform appendix, the coccygeal vertebra (or rudimentary tail), the carnivorous features of the canine teeth, and the slant of the eye which lingers in the Mongolian race, are heirlooms from a pre-arboreal race. The development of scarsorial muscles in the sole of the foot and in the thigh, and the modification of the hand and foot, occurred in a race while becoming arboreal. The reduction of the scarsorial muscles and the modification of a prehensile toe into a fulcrum for the support of the body, occurred in a post-arboreal race. The man-like Apes are not strictly arboreal. The Gorilla at times takes an erect position and walks, but not with ease, on feet well adapted for prehension. When a race of Apes, owing to changes affecting the forest, or affecting the food-supplies, takes more to living on the ground, it will gain advantage by becoming more strictly quadrupedal or more strictly bipedal. The Baboons have sunk into mere quadrupeds, with much of the form and gait of a dog. The Gorillas have risen almost into

bipeds with much of the form and a little of the gait of Man. This Man-like Ape is in a sort of transition between a quadruped and a biped. But Man is the only real biped. To bring the Man up from this transitional state was the crowning achievement of creatio. No higher result can follow. After the human body, nothing; after man, nothing but a better man. What remains is to work out the beast with its appetite, and to work in the man with his aspirations; for the animal which lingers in our bodies lingers also in our minds.

Fort Leavenworth, Kansas, U. S. A.

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