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*Must a
Representation of the Revenue*

Delivered at

Date.

Letray Union

Man—Representative of the Universe.

Without ~~any~~ reference to the mode of origin of man, whether by special creation within a day, or by development from lower forms, or as to whether lower forms of animal ^{life} have come into existence by a descent from man, the purpose to consider some of the points in which man resembles other things in nature. In this we may employ both fact and fancy.

In the ever varied forms we find around us, we are sometimes amazed at the wonderful similitudes, and after minute study we are continually the more inclined to the opinion that the ever varying forms

about us are like an alphabet, made up of a few simple characters, but by their various joinings serve to represent the wonderful variations of sound in the whole of the ever varying possibilities of human speech. The physical man is made up - as the sounds of a language - of a few simple forms, which are infinitely varied in their joinings to form the great variety of organs which minister to that great unknown something called life, the manifestations of which only can be seen and felt, yet is invisible and can not be seen or handled, tasted or smelled, ever present with us yet defies our understanding, is unapproachable, and perhaps inviolably and for-

ever disappears at the slightest touch, this great immortal, ever present, unknown something which we call life resides somewhere within each physical organism. We may search for its home in the animal, we touch a sensitive nerve and from the thrill which runs through the parts, we say we have touched it, but no, this cannot be for we dissect this out and throw it aside and all the manifestations of life remain present in the remaining parts, we go farther and cut away this and that part, yet life remains, but finally perhaps when we last think it life has sudden-

ly fled and we scarcely know *when*
or *why*. One person dies from an ampu-
tation of a leg or arm, another recov-
ers, life remains without the missing
member apparently undisturbed.

While we may have learned many of the
phenomena of the presence of life and the
surrounding conditions of its departure, of
the thing itself we seem to know almost
nothing, and otherwise than its phenomena
it defies our investigation. But what of the
pieces we have cut away, were they devoid
of the principle of life, certainly not, though
after their removal life may not be man-
ifested, because the conditions were unfav-
orable to ~~the~~ ^{its} continuance. But if we take

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up a few of the cells from the under surface of the cuticle and transfer them to a granulating surface upon the same or another person, we will see under these favorable circumstances that even these minute parts possess the principle of life in themselves and for themselves, by this means we may grow a white skin upon a negro, or the negro's black skin upon the white man.

Thus we find that the ultimate histological elements of man, have not only a life in themselves, but they are able to carry some of the special phenomena of that life into strange places, Thus we find that the life of man extends

to the ultimate histological elements
of his physical frame, yet it is said
by Beale, who has made a profound
study of the subject, that only a small
proportion of the human body is en-
dowed with life, that the rest consis-
ts of formed material, which has pass-
ed the stage of life. This life however
resides in a portion of each ultimate his-
tological element of the body, each indi-
vidual cell is a living element of the
complex whole. While these individual
elements go to form the whole and work
as a whole in sustaining the general
life, each particular element of the body
has its own special life and a special

office to perform. These may be divided into great classes or groups, each of which groups must collectively perform their special task.

The epithelial cells of the surface flatten out, become dense and impermeable to form the outer covering to protect essential organs beneath, another variety of the same cell form the soft flexible mucus membranes, still another variety form the gland cells, which perform the office of secretion and excretion, of these we have many groups, each group differing as to their task. One group secretes saliva, another gastric juice, another pancreatic juice, another bile, and so on.

through a list, the combined office of which is to minister to alimentation.

Another list of groups form the sewers of the body, and separate the waste material and cast it off.

From the epithelia, we may pass to the connective tissue groups, one of which ministers to the fleshy frame work, in which the more active organs are imbedded and supported, another the osseous frame which gives strength and form, and another the great muscular system, by which it is moved.

Then we may search the nervous system with its massive ganglia, commissures, and nerves, here we find a little knot of cells gathered together, with their

slender white arms entwined about each other, as if in close consultation, while in the brain we find great cities of cells from which great thoroughfares of telegraphic wires are stretched to every part of the body, remote and near communicating with each little group, as they pass apparently overlooking and regulating the work of all the various groups of cell forms. Man is a universe within himself, though he may be small compared with the great universe of God, yet within him we may find the type of all that exists, search his body, and number the ultimate elements of which it is composed, and we find all or nearly all of the ultimate

elements of the physical universe, not in the same form perhaps, for the invisible power of life has been manipulating them, and doing with them that which we cannot understand. But when life has departed we can undo his work and obtain the simple elements, and learn what material has been used.

Now if we pass to the lower animals and minutely examine their structure, we will find the same alphabet spells out the sum of their physical frame. if we descend low in the scale of animal life, we may find that some of the letters are missing, but those that remain have the same meaning.

The form of the letters or cells remains almost the same. If we examine the epithelia of the mouse or elephant, we find that the epithelia of man is its representative. Examine their gland cells which minister to alimentation, the histologist might show them to his classes, as the gland cells of man without the fraud being discovered and so we might go through the entire list and we will find that the difference is not in the ultimate histological elements of living forms but in their distributions and joinings.

Descend lower still in the scale of life and we will find a dif-

ference, but what a difference, and what its significance, I laid open the brain of a human Fetus of two months, and transferred some of the developing cells found there (imperfectly formed characters) to the microscope, my eye met strange letters, strange forms in this developmental stage, No; we have seen these forms but where, let us see, going to the case we take out some sections of the brain of adult frog, and find that this developmental form of the Fetus perfectly represents the developed form in the Frog. The brain cells of the frog have only attained to that stage of

perfection which is met in the human Fetus of two months. Examine again and we will find a peculiar similarity in the outer epithelial coverings. Upon the Fetus the cells have not become flattened and impermeable, those of the Frog exhibit a like condition. Again let us examine the teeth and we will find exactly the same processes going on in one as in the other and in precisely the same way, except that in the Frog there are present some developed teeth that are being shed.

We will also find in some parts of the body of this animal some

tissues that are closely represented by the Fetal tissues so called from the evident imperfections as compared with the same parts of the adult man.

If we descend lower still in the scale of life, we will find this imperfectly formed Fetal tissues (but partially shaped alphabetic forms) is the perfect representative of the greater bulk of the tissues of the great tribes of shell Fish, yet in these there is to be found the entire alphabetic expression of the physical frame of man, though several of their characteristic joinings

are absent, we have the epithelia and several of its differentiations, as Mucous epithelium, glandular epithelium, &c. While in the connective tissue group only bone is wanting, with some of the other forms in what may be appropriately termed a fetal stage.

descend still lower down to the larger anamalcules, and here we will find the whole body of the animal is made up of the most primitive form of the fetal tissues, much as it exists in the earliest stages of the Fetus, before the future alphabetic characters are clearly made out. In this group

of animals could we stop long enough we would find much that would interest us. A characteristic thought we must present. In all these phases of life some particular letters, or groups of the letters that spell out the physical man are found especially developed, while the others are but partly shadowed out, or seem not to exist. Examine the group of little animals known as the Stentors, their bodies are a jelly like mass of which the most primitive fetal tissue is the representative. But covering the entire body, and especially about the entrance to the

elementary canal are the most perfectly formed cilia to be found in nature. The representatives of these are to be found in man, in the cilia of the air passages, and in the fallopean tubes. In the air passages they assist in respiration, and aeration of the tissues by drawing the air in definite courses along the smaller bronchi.

In these humble animals we find them performing a like office, assisting in respiration by driving a current of water past the little being that oxygen may be abstracted from the ^{fresh} portions of water thus presented. They are also made to serve

as organs of locomotion. It is only in such animal forms that the cilia and their motions and office in man can be easily studied and understood.

We must descend yet lower in the scale of life, and study that strangest form of all, that simplest of all animal forms, the Amoeba, a mere speck of animated protoplasm, so small that it can scarcely be discovered with a less magnifying power of the microscope, than five hundred diameters, in this the last of all the full alphabet of characters, with which we started have disappeared, except the first and most

important letter, protoplasm, and a few insignificant granules, which may be said to be either the forshadowing of, or the remnants of other characters, yet this minute undifferentiated being is able to seek food, attack and overcome its prey, indeed engage in the struggle for life, common to man and all else in the world.

In the type of a being so lowly as this found in man, the monarch of the world, who is to subdue it, to conquer it, yes, in the wandering cells of man, those tiny bits of protoplasm, that wander unrestrained

through his tissues, through the walls of his bloodvessels and every where are apparently the same thing with very little change of either appearance or habit.

Let us take the egg, all animals agree so far as they have been made out in passing through the egg stage of existence, Not only is this true but in all animate nature, the egg in its essential characteristics is the same no matter what kind of animal is to be developed from it, there is no difference between the egg that is to develop the man, and the egg that is to develop the lion, the elephant,

or the frog, the eagle or the humming bird, the hippopotamus or the sun-fish. The characteristics of the germinal spot, the essential element of the egg, without which it is not an egg, is one and the same in all, the apparent differences being only in the arrangement and quantity of albumen with which it is surrounded.

Now if we examine the lower forms of plants, we will find it exceedingly difficult, in many cases almost impossible to distinguish them from the lower animal forms, so nearly do their ultimate

histological elements coincide. In these again we find the same cilia with much the same motion observed in the lower animal forms, but, ^{as} we follow them upward through their variations, we find a marked divergence, yet in the closer histological forms a wonderful agreement. It is like the examination of the alphabet of another nation, there is a difference in the formation of the characters, and a marked difference in the outlines of their groupings, so that they spell out different sounds. But as the sounds thus grouped give expression to sim-

ilar principals of thought, do the his-
 tological characters of plants spell
 out the physical sum of a life prin-
 ciple similar to that of the animal
 forms. In very many instances the
 similitudes are exceedingly close.

Just as all animal forms pass
 through the egg stage, so do the plant
 forms pass through the seed stage
 of existence, indeed the seed is but
 another name for that egg form
 which a plant is to be developed.

Again as the animal egg, the product
 of the female, requires in its earliest
 stages, the male element for its
 fructification, so does the plant, the

product of the female, for its function. They also agree in being made up of cells and fibers curiously interwoven, which are in many respects closely allied. Take for instance the adipose tissue cells of man, and the fresh pith cells of a growing plant, and place them under the microscope and we will find that it will be difficult to tell the one from the other, so nearly do their general appearance coincide. Wander through the whole of their histology and it abounds with similar histological expressions.

If we take up their physiology

we find such a close resemblance that scientists often find it most convenient to use the same terms in describing them. The leaves are the lungs of the plants, by which the creation of ~~their~~ tissues are accomplished by the same element of the atmosphere that creates the tissues of man:

The animal forms take their food within their bodies, where a process of digestion is carried on, as a preparation for its appropriation. Plants absorb their food directly from without, this disagreement is but one of form, food in the

stomach is yet outside the man proper, still a foreign element, to which gastric juice is sent out to dissolve, and bring in. There we get the process of absorption much as it occurs in the vegetable world, this same action is also performed by the vegetable forms. Those that catch insects and other small animals in leaves, which form traps, and where a secretion is sent out to dissolve and bring in. Of this the stomach of man is the perfect physiological representative.

Hundreds of ^{special} similitudes might be found in the vegetable and animal world

if we had the time.

The inorganic kingdom must exist as the basis of the vegetable kingdom.

The vegetable kingdom must exist as the basis of the animal kingdom.

all of these must be in practical existence, as the basis of the exist-

ence of man. They are directly dependent the one upon the other, the plant

must appropriate and modify the inorganic, through the manipulations of its characteristic life force,

before the animal life force is able to successfully grapple with it.

We can conceive of the possibility of the existence of an inorganic

world, without a vegetable world. Such is our conception of our satellite, the Moon cold, dreary, cracked and ragged, without atmosphere or cloud, reflecting as cold, and heartless a light as the face of an aged miser hoarding his wealth. We cannot conceive of a vegetable world without the basis of an inorganic world, such a picture has never been attempted by either ancient or modern mind. A world composed of the inorganic and the vegetable is a possible conception. But by whom or how shall the picture be drawn.

Before the first tiny shrub has put forth its foliage, spread out the brilliant leaves and petals of its flowers to the noon day sun, and ripened its golden fruit, the beginnings of an animal world will have sprung into existence to enjoy its beauty, and harvest its fruitage.

Can we conceive of an animal world based directly upon an inorganic world, without the intervention of a vegetable world? Such a conception would require a still more absurd type of reasoning than the ancient metaphysics, which placed the head of a man upon a lions body, or painted both wings and

arms upon the shoulders of man without the muscles by which the wings could be moved in flight.

Materially, man is the offspring of the storm ground rocks, there is in him the elements of all that is beneath him, of the inorganic, the vegetable, and the animal, he originates in protoplasmic as those beneath him, the life is all the same, the same force originates them all, protects them all, perpetuates them all, unity and simplicity is the character of them all, man includes them all, represents them all, is more than them all. The animals feel, but man feels that he feels.

These remarkable coincidences are the finger prints of one creator, the offspring of one mind, the result of one thought.

But it is said that the mind of man is his crowning glory; and justly; for ~~us~~ in him we find the highest development of mind known to the physical beings. But is mind peculiar to him alone, or is this also an attribute of other animal forms. As brain, physical, material brain is necessary to the manifestations of mind, so is mind a necessary result of brain. If this be true (and its denial is unpracticable by any sound

process of reasoning) their mind in some degree is an attribute of every creature, as far down in the scale of existence as the manifestations of nerve force can be traced.

It is unpracticable in a paper like this to enter into a discussion of the manifestations of mind in the lower animal forms. To do this we must study the elephant as he seeks his food or eludes his enemies, the mouse as she steals the crumbs from the floor, the tiny ant as ~~the~~^{his} lays in his store of food or marshals his hosts to repel an attack upon his home, the quail as she flutters along the

ground, as if unable to fly to draw you away from her nest, and ^d a thousand other scenes, which show the manifestations of mind.

Men are not so entirely unlike animals in their mental attributes. How often do we see men, who ^{are} like the solitary shark roaming about the seas, knowing no friend, whom they would not sacrifice to their own personal desires, who's mission seems to be to distort, degrade, and destroy all that is manly, or good, or noble, or beautiful, all that can minister to the happiness of their fellows.

Others are more like the wolf,

they go through the world with a perpetual snarl, and their nearest approach to happiness is, when they are in the midst of a snarling pack.

Again we find others who are like the garden with its beautiful shrubs and flowers, making glad all hearts, and spreading happiness about them, as the rose spreads its perfume.

Men are now and then found, who can only be compared to the great mountains, around who's lofty brows the storms of the world are forever pouring their thunders and turbulent torrents, wrenching off their substance, and washing it

away down the vallies, to be the food
of the delicate lillies, and support
~~that~~ thousands of harvests of golden
grain, these men stand out boldly, as
mountains upon the horison of time,
the storms of the world have centered
about or in them, and the ~~storms~~ ^{strife}
of the waring elements of thought,
have swept down rich treasures of
reason, and strown them all along
down the levels of intelligence, where
they shall forever be lodged, yet
forever float on down the stream
of the generations, that are to come,
enriching human wisdoms harvests
for all time, ~~to come~~, such was

36.

Plato, such was Newton, such was
Humboldt, and such was our own
Lincoln.