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ON THE PRINCIPLE OF VITALITY.

A

DISCOURSE

DELIVERED IN THE

FIRST CHURCH IN BOSTON,

TUESDAY, JUNE 8th, 1790.

BEFORE THE

HUMANE SOCIETY

OF THE

COMMONWEALTH OF MASSACHUSETTS.

BY B. WATERHOUSE, M. D.

PROFESSOR OF THE THEORY AND PRACTICE OF PHYSIC, AND LECTURER
ON NATURAL HISTORY IN THE UNIVERSITY OF CAMBRIDGE.

Of all the Powers in Nature, HEAT is the CHIEF. Bacon.

B O S T O N :

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COMMONWEALTH OF MASSACHUSETTS.

At a Semiannual Meeting of the Humane Society,
held in BOSTON, June 8, 1790.

VOTED, That the Honourable the President, the Vice-President, and Monsieur *De Letombe*, Consul of *France*, *William Tudor* and *Loammi Baldwin*, Esq's, be a Committee to wait on *Benjamin Waterhouse*, Esq; M. D. and return him the Thanks of this Society for his ingenious discourse delivered this day, and to request of him a copy for the press.

Attest.

JOHN AVERY, jun. Sec'y.

TO THE HONOURABLE
JAMES BOWDOIN, Esq; LL.D. F.R.S.

&c. &c. &c.

P R E S I D E N T,

THE HONOURABLE THOMAS RUSSELL, Esq;

V I C E - P R E S I D E N T,

A N D

THE OTHER TRUSTEES of the HUMANE SOCIETY

O F T H E

COMMONWEALTH OF MASSACHUSETTS,

THIS DISCOURSE,

DELIVERED AT THEIR REQUEST,

IS MOST RESPECTFULLY DEDICATED,

BY THEIR HUMBLE SERVANT,

BENJAMIN WATERHOUSE.

TO THE HONOURABLE
JAMES BOWDOIN, ESQ. LL.D. F.R.S.

O ART! thou *distinguishing* attribute and honour of *human* kind! Wide and extensive is the reach of thy dominion. No ELEMENT is there either so *violent*, or so *subtle*, so *yielding* or so *sluggish*, as by the powers of it's nature to be superior to thy direction. Thou darest not the fierce impetuosity of FIRE, but compellest it's violence to be both obedient and useful. Nor is the subtle AIR less obedient to *thy* power, whether thou willest it to be a minister to our pleasure or utility. Even WATER itself is by *thee* taught to bear us; the vast ocean to promote that Intercourse of nations, which ignorance would imagine it was destined to intercept.

Harris's Dialogue concerning ART.

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A

D I S C O U R S E

O N T H E

P R I N C I P L E O F V I T A L I T Y .

WERE the European Philosopher to turn his eyes on this new Empire, to see in what order and degree those dispositions and arts, which characterize polished humanity, arise among us, he would undoubtedly perceive that the extension of benevolence has kept exact pace with the diffusion of knowledge.

Our venerable ancestors early sowed the seeds of science in this land, and watched their growth with pious care ; and it is not difficult to discover the diffusive spirit of benevolence following every where the encreasing light of science.

Without being particular on this head, one instance of it honourable to humanity, is the cordial adoption, and generous support given to this *Humane Society*, which is formed on a very extensive scale of benevolence.

I decline giving a history of this or similar institutions ; nor shall I descant on the beneficial influence of those numerous humane associations, which mark and dignify the age in which we live. Suffice it to say, that the success attending the Societies established for restoring drowned persons at *Amsterdam, Hamburgh, London, Padua, Vienna, Paris* and elsewhere, induced some respectable characters to form one in Boston. But they have gone beyond the European Societies, and have extended their plan not only to the restoration of life, when apparently lost, but to the preservation of it when in imminent danger.

It is scarcely necessary to say that the plan of this Society is totally void of all private interested views. None of its members receive any other recompence than the sublime joy of doing good.

I shall avoid speaking of any particular mode of treating persons apparently dead, and shall confine myself to the great principle of VITALITY, ANIMATION, or LIFE. I feel the difficulty of doing justice to so copious a subject in the short space allotted to a discourse.

The subject of animation is not merely curious, but leads to usefulness. It has arrested the attention of Philosophers in almost every age of the world. Some of the antients reasoned thus on it, matter of itself cannot move, yet it is evident all things

things change, and that nothing is truly lost; that the sum total of matter in the Universe remains perfectly the same; and as it was the work of OMNIPOTENCE to create something out of nothing, the same Omnipotence is required to reduce any thing back to nothing.† It is apparent that there is an universal change, or mutation of all things into all, then must there be some *one primary matter*, common to all things out of which they were made—They went still further, and enquired into the *moving principle*, the *efficient cause*, that is to say, *that cause*, which associates the elements of natural substances, and which employs them when associated, according to their various and peculiar characters ‡ This moving principle they called the *Anima Mundi*, the *Soul of the World*.

THALES, one of the seven wise men of Greece, maintained, that *Water* was the subtile principle that moved all things. He concluded so, from observing that matter was chiefly dealt out in moisture; that the seeds of plants so long as they are in a growing state, are moist; and that a vegetable will grow to a considerable size from water alone; that the Earth is refreshed, recruited and made fruitful by water:—that the Air itself is but an expansion, or expiration of water. He reminds us of the immense quantities in the subterraneous regions, whence fountains, and rivers, like so many veins in the body, convey water over the surface, and through the bowels of our Globe, to vivify and sustain the whole.

HERACLITUS

† See Bacon's account of antient opinions.

‡ See Harris philos. arrang.

HERACLITUS maintained a very different doctrine. He taught that *Fire* was the vivifying principle of all things. He allowed the truth of *Thales'* doctrine, but observed that *fire* had such an universal sway in nature, that water itself was not without a mixture of it; for that water grows hard and congeals into Ice when fire leaves it, and is only restored to its fluidity by entering it again. He remarked that the whole mass of waters in the sea, was actually an ocean of fire, seeing there were not two distinct drops of water, which do not owe their fluidity to some portion of fire enclosed within them. So deeply rooted was the doctrine that fire was the first or animating principle, that there were, and still are whole nations who worship it as a Deity. †

ANAXIMENES contradicted both these philosophers; and contended that *Air* was the vivifying principle and first mover of all things. He observed that although the water of *Thales* could not subsist without the fire of *Heraclitus*, yet fire itself could not exist without *Air*, which was the very spirit of flame and the breath of life. That no seed of vegetables, eggs
of

† That venerable sect of Philosophers, the *Stoics*, taught that there was one infinite eternal, almighty mind, which being diffused through the whole universe of well ordered and regularly disposed matter, actuates every part of it, and is as it were the soul of this *vast body*. The parts of this body they say, are of two sorts, viz. the *Celestial*, as the Planets and fixed stars: and the *Terrestrial*, as the Earth, and all the other elements about it. The celestial continue without change, or variation. But the whole sublunary world, is not only liable to dissolution, but often hath been, and shall again be dissolved by *fire*: and that the reciprocal deaths, dissolutions and digestions, which support by turns all the substances which we see, are the effects of *fire*.

See CREECH's preface to the translation of C. MANILIUS.

of animals, be they ever so ripe, or pregnant, and cherished with ever so kindly a warmth, will ever bring forth the embryos contained in them, if they be totally deprived of air. We shall see hereafter the necessity of attending to these powerful agents, *fire* and *air*, in the resuscitation of those apparently dead by suspension, submerfion, or frost.

Let us now examine the subject of animation with the light afforded us by more modern Philosophers.

From them we learn that matter is inert, that any one particle of matter left to itself will continue always in the same state, with regard to its motion or rest. There are, however, certain powers, which *two* particles of matter have of acting on one another, as in gravitation and cohesion. We learn also that there is an attraction of *chryfallization*, by which bodies when fluid become in time solid, and assume a particular figure; that there is an attraction of *magnetism*, by which a piece of iron, in certain circumstances, attracts another piece of iron; that there is an attraction of *electricity*, by which a substance charged with more electric matter flies to another charged with less. There is, moreover, *chemical attraction*, by which two particles of different bodies rush together, and form one. If we add that most of these have their opposite repulsions, we can say that they are all the known properties of mere matter; and there is nothing in them that can merit the name of *vitality*.

B

But

But there is in a growing vegetable a power beyond all this; viz. a power which first moves, and then conducts that latent process by which a seed becomes a plant.

Now, every body capable of growing, has a certain internal adjustment, disposition, or arrangement of its matter, which is called *organization*; and being capable of encreasing in bulk has a certain degree of *vitality*. There is a scale of life, stretching in uniform gradation from human excellence downwards, till it disappears in a shade of ambiguity, in the living state of vegetables. † Life, says the *Bishop of Landaff*, belongs alike to both the animal and vegetable kingdom, and seems to depend on the same principle in both. Stop the motion of a fluid in an animal limb, by a strong ligature, the limb mortifies beyond the ligature and drops off; a branch of a tree, under like circumstances, grows dry and rots away.—Both animals and vegetables are subject to be frost-bitten and to consequent mortifications; both languish in excessive heats; both experience extravasation of juices from repletion, and pinings from inanition; both can suffer amputation of limbs without being deprived of life, and in a similar manner both form a callus; both are liable to contract disease by infection; both are strengthened by air and motion.

Every seed of a Plant is an organized body endowed with vessels, and contains under several membranes the plant in miniature. ‡ If this seed be put into the *moist* earth, and a certain

† Brown.

‡ Look at the engravings in *Grew's anatomy of plants*.

certain degree of *heat* applied, with a free access of *air*, (the three principles of the antient Philosophers) the juice in these vessels will expand by the warmth ; and being thus once put in motion, gradually encrease, and grow up into a plant ; which plant produces a similar seed, capable of propagating it's kind forever.

In like manner an Egg is an organized body, which contains under several envelopements the chicken in miniature, and may be considered as a womb, detached from the body of the parent animal, in which the embryo is just beginning to be formed ; if warmed to a certain degree, whether by the parent animal, or by art, the fluids which surround that speck in the egg called the *punctum vite*, expand, and the little vessels swell and extend themselves ; and the motion, or oscillation once began, it develops, by degrees, until it becomes a perfect animal, capable of all the functions common to its kind.

The seed of the vegetable, and the egg of the animal would remain, or rather *become* effete and inanimate, unless some stimulus, some agent *from without*, excited or began a motion in them. But what is this agent, or stimulus ? For that is the question. —

This stimulus, or animating principle in a natural body, does not depend on its organization, nor its figure, nor any of those inferior forms, which make up the system of its visible qualities ;

qualities ; but it is the *power*, which not being that organization, nor that figure, nor those qualities, is yet able to produce, to preserve, and to employ them. It is therefore the *power*, which departing, the body ceases to live, and the members soon pass into putrefaction and decay. †

From an attentive observation of animated nature, we discover that life is caused, and continued by something which acts from without ; and this something is (as far as we can discover) *heat*, acting on the seed or egg. I say *heat*, according to the common acceptance of the term : but to speak more philosophically, it is *that subtil electric fluid, which fills the immense space of the whole Universe, pervades all bodies, and actuates every particle of matter.* Heat is only one effect of its motion.

In whatever manner a susceptible or irritable body is operated upon by this exciting power, a certain quantity of it, or a certain energy, is assigned and belongs to every individual system upon the commencement of its living state. ‡

Now,

† Harris Phil. Arrang.

‡ Brown.

Anatomical Description of a Hen's-egg ; with the history of the growth of the animal contained in it.

IMmediately under the shell, lies that common membrane, or skin, which lines it on the inside, adhering closely to it every where, except at the broad end, where a little cavity is left, that is *filled with air* ; which encreases as the animal within grows larger. Under this membrane are contained *two whites*, tho' seeming to us

Now, a living animal has, besides those attributes common to all bodies, as solidity, extention and gravity, a *peculiar something*, which distinguishes it from a dead one; for a muscular fibre will contract, and that not by the power of gravitation, cohesion, chrySTALLIZATION, magnetism, or chemical attraction.

That

to be only *one*; each wrapped up in a membrane of it's own, one white within the other. In the midst of all is the *yolk*, wrapt round likewise with it's own membrane. At each end of this are two ligaments, called *chalazæ*, which are white dense substances, made from the membranes, and serving to keep the white and the yolk in their places.

The *cicatricula* is the part where the animal first begins to shew signs of life; it resembles a vetch or small pea, lying on one side of the yolk and within its membranes. The outer membranes and ligaments preserve the fluids in their proper places, the white serves as nourishment; and the yolk with its membranes, after a time, becomes a part of the chicken's body. This is the description of the *hen's egg*, and answers to all others, how large or how small soever.

Previously to putting the eggs to the hen, *Malpighi* and *Haller* first examined this cicatricula, which they consider as the most important part of the egg. This (which some call the *punctum saliens*, or *punctum vitæ*) was found in those that were impregnated by the male to be large, but in others small. Upon examination with the microscope it was found to be a kind of bag, containing a transparent liquor, in the midst of which the *embryo* was seen. The embryo resembled a composition of little threads, which the warmth of future incubation tended to enlarge.

Upon placing the egg in a proper warmth, after six hours the *vital speck* begins to dilate like the pupil of the eye. The head of the chicken is distinctly seen, with the back-bone something resembling a tadpole floating in its ambient fluid, but as yet seeming to assume none of the functions of animal life. About six hours more the little animal is seen more distinctly; the head becomes more plainly visible, and the *vertebræ* of the back more easily perceivable. All these signs of preparation for life are encreased in six hours more; and, at the end of 24, the ribs begin to take their places, the neck begins to lengthen, and the head to turn to one side.

At this time, the fluids in the egg seem to have changed place; the yolk which was before in the center of the shell, approaches nearer the broad end. The watery
part

That state of an animal fibre in which a contraction, or oscillation, is produced by the influx, or contact of a stimulus, is called *irritability*, or *susceptibility*.

That principle in animals, on which sensation, motion, and all the animal powers depend, is called the *Vis Vitalis*.

By

part of the white is diminished, the grosser part sinks to the small end; and the little animal appears to turn towards the part of the broad end, in which a cavity has been described, and with its yolk seems to adhere to the membrane there.

At the end of 40 hours the great work of life seems fairly begun, and the animal plainly appears to move; the back bone thickens; the first rudiments of the eyes begin to appear; the heart beats, and the blood begins already to circulate. The parts, however, as yet are fluid; but, by degrees, become more and more tenacious. At the end of two days, the liquor, in which the chicken swims, seems to encrease; the head appears with two little bladders in place of eyes; the heart beats in the manner of every embryo where the blood does not circulate through the lungs. In about 14 hours after this, the chicken is grown more strong; the veins and the arteries begin to branch, in order to form the brain; and the spinal marrow is seen stretching along the back-bone. In three days, the whole body of the chicken appears bent; the head, with its two eye-balls, with their different humours, now distinctly appear; and five other vesicles are seen, which soon unite to form the rudiments of the brain. The out-lines, also of the thighs, and wings, begin to be seen, and the body begins to gather flesh. At the end of the fourth day, the vesicles that go to form the brain approach each other; the wings and thighs appear more solid; the whole body is covered with a jelly like flesh; the heart, that was hitherto exposed, is now covered up within the body, by a very thin transparent membrane; and at the same time, the umbilical vessels, that unite the animal to the yolk, now appear to come forth from the abdomen. After the 5th and 6th days the vessels of the brain begin to be covered over; the wings and thighs lengthen; the belly is closed up, and turned; the liver is seen within it, very distinctly, not yet grown red, but of a dusky white; both the ventricles of the heart are discerned, as if they were two separate hearts, beating distinctly; the whole body of the animal is covered over, and the traces of the incipient feathers are already to be seen. The 7th day, the head appears very large; the brain is covered entirely over; the bill begins to appear betwixt the eyes, and the wings, the thighs, and the legs, have acquired their perfect figure. Hitherto, however, the
animal

By the action of stimuli on the solids, particularly *heat*, the *vis vitalis* is excited and preserved; when diminished it may be increased, and *when suspended it may be restored*.

Within

animal appears as if it had two bodies; the yolk is joined to it by the umbilical vessels that come from the belly; and is furnished with its vessels, through which the blood circulates, as through the rest of the body of the chicken, making a bulk greater than that of the animal itself. But towards the end of incubation, the umbilical vessels shorten the yolk, and with it the intestines are thrust up into the body of the chicken by the action of the muscles of the belly, and the two bodies are thus formed into one. During this state, all the organs are found to perform their secretions; the bile is found to be separated, as in grown animals; but it is transparent, and without bitterness; the chicken then also appears to have lungs. On the 10th, the muscles of the wings appear, and the feathers begin to push out. On the 11th, the heart which hitherto had appeared divided, begins to unite, the arteries which belong to it, join into it, like the fingers into the palm of the hand. All these appearances, come more into view, because the fluids the vessels had hitherto secreted, were more transparent; but as the colour of the fluids deepen, their operations and circulations are more distinctly seen. As the animal thus, by the 11th day, completely formed, begins to gather strength, it becomes more uneasy in its situation, and exerts its animal powers with encreasing force. For some time before it is able to break the shell in which it is imprisoned, it is heard to *chirrup*, receiving a *sufficient quantity of air for this purpose*, from that cavity which lies between the membrane and the shell, and which must contain air to resist the external pressure. At length upon the 20th day, in some birds sooner, and later in others, the enclosed animal breaks the shell within which it has been confined, with its beak; and by repeated efforts, at last procures its enlargement.

From this history we perceive, that those parts which are most conducive to life, are the first that are begun: the head and the back-bone, which no doubt enclose the brain, and the spinal marrow, though both are too limpid to be discerned, are the first that are seen to exist; the beating of the heart is seen soon after; the less noble parts seem to spring from these, the wings, the thighs, the feet, and lastly the bill. The resemblance between the beginning animal in the egg, and the embryo in the womb, is very striking — An egg may be considered as a womb, detached from the body of the parent animal, in which the embryo is but just beginning to be formed. It may be regarded as a kind of incomplete delivery. The similitude between the egg and the embryo in the womb has induced many to assert (and with great probability) that all animals are produced from eggs.

Goldsmith's History of Earth and animated Nature, vol. 2d. See also *Malpighi, Haller, Graff and Buffon*.

Within every one of us, there is an *innate* and *active power*, which ceases not its work, when sense and appetite are asleep; which without any conscious co-operation of the man himself, carries him from a seed, or embryo, to his destined magnitude. This is strictly speaking the *Animal Economy*, and is as perfect in the brutal Hottentot, as in the brightest genius of human kind.

All this depends on a principle which some call the *Vis Actuosa*, others the *Impetum Faciens*. This power is *innate*, and is that by which man lives; it forms him, it nourishes him, refreshes him, moves him, animates him. By it he feels, he desires, refuses, sleeps and wakes; nevertheless, it is totally different from the *Mind*: For,

In our bodies is found something of quite a different nature from what has been mentioned; a power of thinking, reflecting, comparing, chusing, and representing to itself past, present, and to come. This power, in relation to its several operations, is termed comprehension, understanding, reason, mind, will, freedom, or collectively, by the single word SOUL.† But to return to the innate principle of animation in man.

Every body knows that although the child is formed, and lives, and grows, and moves in the womb of its mother, it never breathes there. It receives its animating principle, its heat,

† See Herpert.

heat, motion and life from the mother, by a nerve and artery, which enters at its navel and conveys the blood to the heart of the infant, *without ever passing through the lungs*. The blood in this case goes directly on through the body of the heart, by an opening called the *Foramen Ovale*, and from thence to the *Aorta*, or great Artery, by which it is driven to every part of its body ; so that the circulation, nutrition and life, are kept up with the mother, as if they were not two bodies but one. It is remarkable that the fruit of vegetables is, in like manner, nourished, and supported by a slender stalk issuing from the parent stock.

When the child is born it becomes dependent on a *new* principle for the continuance of its existence. When it passes from its watery habitation into the atmosphere, a new determination takes place ; and instead of the *umbilical cord* from the mother, the common air becomes the *main-spring* of all its actions and functions. When the child opens it's mouth to cry, down rushes the air and expands the lungs. The blood, which had hitherto passed *through* the heart, now takes a wider circuit, and the *foramen ovale* closes forever. The lungs which had till this time been inactive, now first begin their functions, and they cease not their motion as long as life continues.

Hence then, it appears, that next to the expanding power of heat, *Respiration*, or *breathing* is the *primum mobile* in the human machine.

Atmospheric-air contains a certain *vivifying spirit*, which is necessary to continue the lives of animals, and this, in a gallon of air, is said to be sufficient for one man during the space of a minute, and not much longer. Air that has lost this vivifying spirit, deadens fire, extinguishes flame, and destroys life. †

It is well known that there is a set of vessels in the lungs, which contain air, and another which contain blood.

The air in the lungs is in constant motion, for either that which is at present contained in the cells, is passing through the wind-pipe into the atmosphere, or a fresh parcel is passing from the external atmosphere through the wind-pipe into those cells. The whole of this compound motion is called *Respiration*. †

If the air continue at rest in the lungs for many minutes, or if a man continue to respire the same air, or if he breathes air that hath served for the inflammation of fuel, or pure fixable air, or any other vapour, excepting respirable air, he dies †.

From the organs of respiration, or rather from what may be called the *systema spirituale pneumonicum*, all the actions of the body, and all the power which it exerts are ultimately derived.

† Ferguson.

† Fordyce.

It appears from a train of experiments, that the common air communicates a vivifying something to the blood, when drawn into the lungs, and gives to it a stimulating quality, by which it is fitted to excite the heart to action ; and that the chemical quality, which the blood acquires in passing through the lungs, is necessary to keep up the action of the heart, and consequently the health of the animal. For no sooner are the lungs quiescent than the heart ceases to contract, the blood stops, all the intellectual operations cease, sensation and voluntary motion are suspended, and all external signs of life disappear. All which are admirably explained by Dr. *Edmund Goodwin*.†

When the fluids in the human machine are thus at rest, what do we see ?—a mere carcase—We see the person dead ! But after what manner ? Here are all the solids, and all the fluids too. What then is lacking ? A gentle oscillation, or motion of the fluids, a circumgyration of the liquors ; for let there be by what means soever an oscillation, a concussion, or excitement of the nervous energy, which may impel the fluids to move the lungs and heart, life immediately returns, with the usual circulation of the blood and other fluids, heat, colour, agility, *cogitation*, and every vital, natural and human action.‡

If

† See his experimental Enquiry, &c.

‡ There are several instances of people buried alive, even in this country.

Oh, reader ! ———— But that I am forbid

To tell the secrets of *the* prison-house,*

I could a tale unfold, whose lightest word

Would harrow up thy soul, freeze thy young blood,

Make thy two eyes, like stars, start from their spheres. ————

* The GRAVE,

If it be asked, *what is that vivifying something which through the medium of the atmosphere, gives this oscillation or concussion, and continues life?*

I answer ; it is a portion of that subtil electric fluid, which fills the immense space of the whole universe, pervades all bodies, and actuates every particle of matter. By it the phenomena of magnetism, fire, and light are produced ; and on it the various and astonishing phenomena of VEGETATION and ANIMATION depend. If it be asked further, what and where is the source of this all powerful agent ? I answer, the SUN is the efficient cause of the motions of this fluid, and the various phenomena of our system are the effects of these motions.

Soul of surrounding worlds !

Without whose quickning glance, this cumbrous earth
Would be a lifeless mass, inert and dead,
And not as now, the green abode of life. †

I am aware that analogical arguments are probable, but not conclusive; and that plausible inferences from well known facts in brutes, have occasioned many errors respecting man. Yet I cannot but believe from what we observe in the resuscitation of swallows, after lying four months in the bottom of a pond ; of snakes frozen stiff as a stick, of flies corked up in a bottle of Madeira in Virginia, and brought to life again in Great-Britain ; ‡ I say, I cannot help believing from these
and

† See Thompson's summer.

‡ See Dr. Franklin's letter to Mons. Dubourg.

and similar facts, that it is possible to restore to life a human being who has been frozen many days. We have well authenticated accounts of not only birds frozen to death (as it is called) but of the human species too, who were even for days, without pulse, breathing, or the least natural heat, and yet resuscitated. †

In this case, the application of heat should be conducted, says Dr. *Goodwin*, on the same plan, which nature points out for the hybernating, or torpid animal; that is to say; it should be applied gradually and uniformly. It may be raised to 98 degrees of Farenheit, but not above 100. To blow one's own breath into the lungs of another, is an absurd and pernicious practice.

The consideration of the facts just related, have led some to conceptions of the *Soul* which have puzzled them, and created doubts rather unfavourable to the opinions entertained by the majority of christians. "What is the condition (say they) of the soul all this time.—In animal bodies there are only two general conditions *life* and *death*; and if by *death* we understand the privation of life, there can be no intermediate state between them, says Dr. *Goodwin*; for no human art can communicate life to *dead* matter. Dr. *Whytte* thinks it is not only probable, but even demonstrable, that the soul does not immediately leave the body upon a total stoppage of the

† See the writings of *Redi* and *Whytte*. The *Flora Siberica*. Also *Peyer* anatom.

the heart's motion, and of the circulation of the blood, i. e. upon what we usually call *death*, but that it continues for some time at least present with it, and ready to actuate it. He thinks with *Gassendi*, *Dr. H. More*, *Sir Isaac Newton*, *Dr. S. Clarke*, and some other of the greatest philosophers of the last and present age, that the soul is extended.

The apparently dead carcase, therefore, which has lain three, or four hours under water, is as much alive as a sound hen's-egg; † they would both putrify and dissolve if let alone; but apply a due and uniform degree of *heat* to either, and you change the *seemingly* dead body into a live and active animal.

The union of soul with body, is the most abstruse contemplation that can exercise the mind of man! How is it that one painful idea alters the course of the blood! Who can explain how the blood in return, carries its irregularities to the mind! What incomprehensible mechanism has subjected the organs to sentiment and thought! What (*says Voltaire*,) is that unknown *fluid*, which is quicker and more active than light, and flies in the twinkling of an eye, through all the channels of life; produces memory, sorrow or joy, reason or frenzy, recalls with horror what one would wish to forget, and makes of a thinking being, an object of admiration, or a subject of pity and tears!

The

† See page 8.

The intellectual scheme, (says the author of *Hermes*;) which never forgets DEITY, postpones every thing *corporeal* to the PRIMARY MENTAL CAUSE. It is here it looks for the origin of intelligible ideas, even of those, which exist in human capacities. For though *sensible* objects may be the destined medium, to *awaken* the dormant energies of man's understanding, yet are those energies themselves, no more contained in *sense*, than the explosion of a cannon in the spark which gave it fire.

This then, like all other sound philosophy, leads us at last, up to the GREAT FIRST CAUSE, the ENS ENTIVM, the SUPREME AUTHOR OF ALL, who is ever to be adored with the most profound reverence by the reasonable part of his creation. †

Thus much towards investigating the important subject of *Vitality* or *Animation*. The narrow limits of a discourse prevent my pursuing the matter further at this time. I pass on to a more general and pleasant theme, *the Progress of Humanity*. Perhaps we may discover the causes which have produced that spirit of benevolence, which gave birth to this society.

It is very common to praise antient times and condemn our own; yet, if we cast our eyes back on the history of mankind, the view will shock us. Of six and twenty cen-

turies,

† Dr. Whyte.

curies, wherein the memory and learning of mankind have been exercised, scarcely six can be culled out as fertile in the sciences, or favourable to humanity!† On a modest computation, the destruction of the human race in building up tyranny by *Sesostris*, by *Semiramis*, by *Xerxes*, by *Alexander*, the *Romans*, the *Sicilians*, by *Mithradates*, the *Goths* and *Vandals*, *Crusaders*, and by the *Spaniards* in *Mexico* and *Peru*, amount to forty times the number of mankind now on the face of the earth.

The Roman name strikes us with such veneration, that we are apt to include *humanity* among their virtues. But the most celebrated virtue of the most renowned Roman would pass without much eulogium in this day. The truth is, their natural roughness of temper, their adoration of *Victoria*, that Deity so dear to the Romans, made them neglect and trample upon their fellow men, whom they scarcely distinguished from brutes. And, when the glory, greatness, strength and learning of that famous people were extinguished, and when their Empire was finally overturned, the cause of humanity was still less regarded.

It was worse, when a northern swarm of Barbarians, the *Goths*, quitting their inhospitable regions, spread through the more fertile parts of the world, and extinguished the small light of learning which remained.‡

And

† See Nov. organ. Bacon.

‡ See Boerhaave's academ. Lectures.

And when *Mahomed* and his successors carried their victories, with the rapidity of a torrent over most parts of *Asia*, *Africa*, through *Persia*, *Arabia*, *Ægypt*, and *Palestine*, they completed the destruction the Goths began.

When the Barbarians embraced christianity, they made it bend to their prejudices, rather than subject their prejudices to it's principles; and from the mixture of christianity with the antient customs of barbarians sprang a discord in manners. From a mixture of the rights of sovereigns with those of the nobility, and of the priesthood, sprang a discord in politics and government. And from a mixture of the Pagans and Mahometans with the Christians, sprang a discord in Religion. Anarchy and confusion were the consequences of so many contrasts:—Europe was one large field of battle, and ignorance and brutal force quenched almost every ray of knowledge, while the noble faculties of the soul were absorbed by fear.†

The extension of benevolence, keeps exact pace with the extension of knowledge, and the exertions of the one are circumscribed by the limits of the other.

Whenever the PARENT of UNIVERSAL NATURE chuses to make a mighty change in the affairs of men, he seems to effect it by, what we call, mean and humble instruments.

D

Two

† See Robertson, Ch. v. and Millot Element. of gen. Hist.

Two seemingly inglorious mechanical discoveries, changed the face of the world more than any conqueror, Sect or Empire ever did. I mean the *Mariners Compass*, and the *Art of Printing*.† These inventions gradually banished barbarism, and humanized the world. The antients were acquainted with but a very small part of the globe. They called all the northern nations, *Scythians*, and all the western, *Celte*, indiscriminately. They had no knowledge of *Africa* beyond the nearest part of *Æthiopia*; nor of *Asia* beyond the *Ganges*, and as for our quarter of the world, *America*, they had not even a tradition about it.‡

Commerce is a cure for the most destructive prejudices. It has every where diffused a knowledge of the manners of all nations.‡ The multiplication of books by the *art of printing*, and of drawings and pictures by the *art of engraving*, produced a radiance of knowledge that made tyranny tremble, and will effectually secure the human race from those horrid shocks of barbarism and tyrranny, that once nearly laid waste the old world. *The Mariners Compass then opened the Universe, and Printing displayed it.*

At this time, superstition, and an odious ecclesiastical despotism, received a fatal wound. Astronomical improvements, by discovering worlds besides our own, expanded the human mind. So that when the christian religion began, again,

† See *Novum Organ.*

‡ *Montesq.*

again, to be taught in its purity, the Universe seemed to extend itself to do it homage. Then did KNOWLEDGE raise *weeping* HUMANITY from the dust, and pointed with her blazing torch the way to happiness and peace! Then did RELIGION, instead of daggers, wrecks and fetters, wear upon her graceful brow this everlasting motto, "*My ways, are ways of pleasantness, and all my paths are peace.*"

Need I say a word to prove to such an audience as this, that the present prevailing spirit of benevolence is principally owing to the diffusion of a Religion, as much above all others, as Heaven is above the Earth? Let him who doubts, compare it with the *next best* system the world ever possessed. Did not Moses bring famine and other plagues on the Ægyptians? Elijah deprived the earth of rain, and destroyed with fire those who opposed him; as did *Elisba* those who mocked him. Did not David kill and curse those he hated or envied? But the *Founder of the Religion of humanity* came without judgment, anger, or revenge. All his transactions were for the benefit of man. He allayed the winds which threatened destruction to the mariners; he restored limbs to the lame, sight to the blind, speech to the dumb, clean flesh to the leprous, a sound mind to the insane, and *life to the dead.*† All his, were works of beneficence, diffusing charity and goodwill to men, accompanied too, with a spirit so sublime and friendly, that the human heart, with unbidden veneration, bows down before it.

While

† See Bacon's Essays.

While we consider *this* HUMANE SOCIETY as a *Stream* deriving its source from that inexhaustible *River of Joy*, the *Ministers of Religion* may be considered its principal guardians. They have been its chief supporters; and so long as they continue to inculcate the precepts of the *Religion of Humanity*, with that benevolent, gentle, pious, charitable, tolerating spirit, which so eminently distinguishes those before whom I now speak, they will be regarded among its brightest ornaments. †

Then will CHARITY, that bright constellation of christian virtues, always be present with us; under whose fostering influence, we hope, this yet infant Society, this standing committee of humanity, will extend; so far and wide, its salutiferous effects, that future generations will have reason to commemorate its exertions with grateful admiration!

† The author rejoices in this public opportunity of rendering a just tribute to the Clergy of *Boston*. He hopes it will not be less grateful, in coming from a person who was educated in that religious persuasion, which teaches every man to be his own priest.

APPENDIX.

AT a Semiannual Meeting of the HUMANE SOCIETY held at the
County Court-House in BOSTON, June 8, 1790.

VOTED, That the Honourable Judge LOWELL, Judge SULLIVAN, and JOSEPH BARRELL, Esq; be a Committee to examine the Treasurer's accounts, and that the said Committee, after examining said accounts, report to the Trustees; who are hereby authorized to publish such parts of the receipts and expenditures as they shall judge proper.

Attest.

JOHN AVERY, jun. Sec'y.

The Subscriber, one of the Committee appointed to examine the Treasurer's accounts, has examined the same and seen the vouchers, and found them right; and that there was a balance in the Treasurer's hands, June 7, 1790, of £. 122 o. 6.

JOSEPH BARRELL.

Boston, July 9. 1790.

Pursuant to the above Vote, the Trustees present to the Public the following state of the receipts and payments, from the Institution of the Society to June 7, 1790.

R E C E I P T S.

		£.	s.	d.
1786.	By subscription of the members in } — — —	80	12	4
1787.	the years 1786 and 1787, } — — —			
	Collection in June 1787, — — — —	13	1	4½
1788.	Subscription of members, — — — —	52	12	8
	Collection in June 1788, — — — —	11	4	0½
	Donation from Capt. John Calef, of the island of St. Christophers, — — — —	1	16	0
	Interest on money loaned, — — — —	1	15	1
1789.	Subscription of members, — — — —	68	6	0
	Collection in June 1789, — — — —	9	1	5
	Donation from George Cabot, Esq; of Beverly, — — — —	1	8	0
	Interest on money loaned, — — — —	3	12	0
1790.	Subscription of members to June 7, 1790, — — — —	43	8	0
		£. 286. 16 11		

P A Y M E N T S.

		£.	s.	d.
1786.	To cash paid for record books, — — —	0	7	6
	Premium for a signal exertion in preserving life,	1	8	0
	Printing the rules of the institution, &c. — — —	5	16	8
	Messenger, notifying several meetings, and } other expences, — — — }	5	14	0
		£. 13 6 2		
1787.	Tobacco machines, — — —	7	16	9
	Advertising, and expence of semi-annual meetings,	2	15	2
	Printing 600 Dr. Lathrop's discourses with the } appendix, — — — }	22	10	0
	Building house on Lovell's Island, — — —	8	0	0
	Ditto on Scituate Beach, — — —	8	9	0
	Ditto on Nantasket Beach, — — —	8	19	10
	Premiums for preserving life, — — —	2	8	0
	Account for printing, — — —	14	10	0
	Messenger, — — —	6	0	0
		81 8 9		
1788.	Premiums for preserving life, — — —	3	6	0
	Tobacco machines, — — —	8	11	0
	Printing advertisements, — — —	1	16	0
	Expences on houses in Boston harbour, — — —	1	16	8
	Ditto of semi-annual meetings, — — —	0	12	8
	Messenger, — — —	6	0	0
		22 2 4		
1789.	Building three houses in Boston harbour, — — —	28	10	0
	Premiums and a gold medal for preserving life,	6	0	6
	Printing circular letter, — — —	1	18	4
	Expences of semi-annual meetings, — — —	0	12	0
		37 0 10		
1790.	Repairs on houses in the harbour, — — —	2	7	4
	Tobacco machine, — — —	2	5	0
	Messenger, — — —	6	6	0
		10 18 4		
	Money at interest and in the hands of the Treasurer, — — —	£. 164 16 5		
		122 0 6		
		£. 286 16 11		

The Society are also possessed of one share in Malden Bridge, being a donation from the honourable Thomas Russell, Esq;

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