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"EVEN AS WE HAVE BEEN APPROVED OF GOD TO BE INTRUSTED WITH THE GOSPEL, SO WE SPEAK; NOT AS PLEASING MEN BUT GOD WHICH PROVETH OUR HEARTS."

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THE DEATH OF COLUMBUS.

BY DOUGLAS SLADEN.

Ho, Christopher Columbus, lift up thy sinking head,
The daughter of thy Lady is weeping by thy bed—

The daughter of thy Lady, Castile's own suzerain,
The heiress of the Indies, of Naples and all Spain,
The Lady of Don Philip, the Roman Kaiser's son,
The Count of wealthy Flanders and Duke of proud Bour-
gogne.

The Arch-Duke is beside her, and she will give to thee
Thine honors and thy treasures and rule beyond the sea;
Ay, they will smile upon thee, and give thee back thine
OWN,
These heirs of Isabella and Mary of Bourgogne.

Stretched low upon a pallet in Leon's noblest town,
A wreck of human greatness was slowly settling down.

The man for whom the Ages one-half the world had sealed,
The man to whom the Ocean its secret had revealed.

What mariner of Palos who looked upon him now,
Thus wasting and enfeebled, with death upon his brow,

Would know him for the Captain, tireless and proof to fear,
Who led the men of Moguer to find a hemisphere,

Would know him for the Viceroy, so royal in his mien,
Who reared on shores Lucayan the banner of the Queen,

Would know him for the seaman whose skill and strength
and faith
On that wild voyage homeward had wrested them from
death?

What Catalonian burgher who looked upon him now
Thus wasting and enfeebled, with death upon his brow,

Would know the great Columbus, who thirteen years be-
fore
Had entered Barcelona, as princes ride from war?

With banners and with trumpets, in velvet pomp arrayed,
And with Castile's Hidalgos to head his cavalcade—

Would know the great Columbus, whom Spain's proud
Queen, long since,
Had risen up to welcome as princes greet a prince?

The scholar and the seaman, the great discoverer-sage,
Was weighed down with a burden too sore for ailing age,

Of scarce a Castellano in that whole land possessed,
For which he had discovered a world beyond the west.

Meanwhile a witless woman, diseased in health and brain,
Was heiress of the Indies, of Naples and all Spain,

And Lady of Don Philip, the Roman Kaiser's son,
The Count of wealthy Flanders and Duke of proud Bour-
gogne:

And all Estremadura, Valencia, Leon,
Murcia, Catalonia, Granada, Arragon.

Castile and Andalusia, that were of knightly sort,
Were whelming her with homage at King Fernando's
court:

And cavaliers and ladies, in cloth of gold arrayed,
And balconies with hangings of velvet and brocade,

And arches with inscriptions, and streets with flowers hung
down
Must grace the royal progress in each triumphal town.

The woman and the witless, with flowers and cloth of gold,
With banners and with music, from voice and trump up-
rolled,

Was welcomed to a palace and seated on a throne,
While stretched upon a pallet, with naught to call his own,

Lay worn with woes and sickness, the wreck of what had
been
The stoutest of all seamen the world had ever seen—

He, who to Spain had given a nobler prize to hold
Than all the Kaiser's empire and Philip's Flemish gold.

The youthful Queen Juana, Castile's own Suzerain,
The heiress of the Indies, of Naples and all Spain,

And the young Prince Don Phillip, the Roman Kaiser's son,
The Count of wealthy Flanders and Duke of proud Bour-
gogne.

Spake gently to the envoys the stricken man had sent
To lay his suit before them and crave accomplishment

Of treaties and conditions, that were granted under seal
By the blessed Isabella, the Lady of Castile;

And promised swift fulfillment, as far as might be done
By Castile and the Indies and Flanders and Bourgogne.

But now the faithful servant was slipping from their hand
And drifting, on a lee-tide, toward a shadowy land,

Where Castile and the Indies and Flanders there were
none,
Nor Austria with its Kaiser-crown, nor Kings of Arragon.

After a stormy passage of well-nigh seventy years,
The battered bark, which carried between the hemispheres

The bright, unconquered spirit, which never knew eclipse,
The hardest that ever had sailed the sea in ships,

Had made a smooth, broad haven, as smooth as is the river
Beside the quays of Seville, the stately Guadalquivir,

And come into fair weather, as fair as in the spring
Of Andalusia's April, when flowers are opening.

What dreams were those that flitted through the great sea-
man's brain,
Born in the wild delirium of his last mortal pain?

Saw he in fading splendor, the city of St. George,
Hemmed in twixt waters Tyrrhene and Alpine Mountain
gorge?

Paused he, with thoughts of childhood, at that wool-
comber's stall
That bore the sign COLOMBO hung out upon the wall?

Or hied he to Pavia, to the gray college-towers,
Where a poor stranger student gave all his toiling hours

To sciences which pilot the sailor on the sea—
The astrolabe and compass and star-geometry,

And reading in crabbed Latin what old cosmographers,
Translated by old scholars, guessed of the universe:

How certain men of Gades, as Aristotle saith,
While driven from their haven before the east-wind's
breath,

Had fallen on a country far out into the West,
Where land or stay they might not, by boisterous winds
oppressed:

And Seneca had written, that 'neath far sunset skies,
In after-coming ages, fresh continents would rise;

And how that the same ocean which beats on Western
Spain,
So wrote the learned Strabo, is India's eastern main;

So that he who should sail westward and sail and sail and
sail,
Would be carried to the Indies before the eastern gale?

Went he then back to Genoa, where at the close of day,
When combing wool was over, the lad would haste away

To talk with bearded masters who hung about the quays,
Men who had sailed for Henry, Prince of the Portuguese;

And told him that, storm-driven, to Brandan's Isle men
came,
And one with Seven Cities, that had none other name,

And boasted of huge pine-trees and reeds of magic girth,
Such as were never growing upon the ancient earth,

Washed on Atlantic islands or met by passing ships;
And how men found at Ferro a staff with carven tips,

Of rudely fashioned figures, such as were never seen
In any savage country where travelers had been;

Of sheep with backs like camels, that carried mighty packs,
And men with hair like feathers and plume-cloaks on their
backs;

And, lastly, how on Flores the fiercest of the storms
Which blew from the southwestward had washed ashore
the forms

Of two strange red-skinned beings who wore the shape of
men,
But of a tribe and country that came in no man's ken?

Went he then back to Naples, transported in his dream
To sounds of crashing timbers and sights of gash and
gleam,

As the fleet of the Free Lances, led by the brave Duke
John,
To win his father's kingdom, usurped by Arragon,

Dashed valiantly into the armaments of Spain
Mid cries for Santiago and René of Lorraine?

And thence to Porto Santo to plight once more his troth
To Philippa Perestrelo, the lady of his youth.

Roaming upon the sea-shore of that Atlantic isle,
Peering, maybe, for wreckage of Western lands the while—

To live once more in fancy his happy wedded life
And fashion his great purpose, sea-severed from all strife—

To live once more in fancy his years of wanderings
While offering high service to stubborn ears of kings—

To live once more in fancy his widowed, ruined state
Until he stood a beggar at Huelva's convent gate;

Once more from siege to palace and palace back to siege,
To follow Isabella, his lady and his liege,

Until the loud *Te Deum* arose in solemn peal
And the flag of Santiago and the banner of Castile

Waved from the topmost turret of the Alhambra's towers
In token that Granada had fallen to the Glaours?

Recalled he then that moment, the darkest in his life,
When loud the voice of triumph proclaimed the end of
strife;

And yet with purpose frowned on—for all his patient
years—
He rode across the Vega, rode through a mist of tears,

To quit the thankless country, which looked on him
askance.

And lay his royal offer before the King of France?

Recalled he then that moment, one of the snatches few—
The interludes of triumph he was vouchsafed to view

Amid the vast achievements of his heroic life—
A mountain-isle of glory in that rough sea of strife,

When Luis de Santangel and the Queen's almoner
Spurred after him to bring him in honor back to her;

Recalled he his emotion when, ere the sun went down,
His gallant little squadron put out from Palos town,

With hope and fear aboard it to sail into the West
Until it lay to eastward of India the blest?

Recalled he then the rapture which filled the little band
When from the "Pinta" thundered the gun that signaled
land!

The lying-to till daylight, the green and goodly isle
Thus risen from the ocean to greet them with its smile

Of spicy, shady forests, sweet, sparkling, running brooks,
Song-birds and human creatures with mild and comely
looks?

Recalled he that vast tempest, which fell on their return
As if the airy powers were leagued in compact stern

With spirits of the ocean to overwhelm the brave,
Who carried to the Nations the secret of the wave?

Recalled he the rejoicing when men of Palos sailed
Up to the town of Palos—the men who had unveiled

That world, which in the Ages' dark womb, close-sealed,
had lain,
And gave it for an heirloom to Isabel and Spain?

Or, pictured he the guerdon the future had for him,
When Envy and Traduction were stricken dumb and dim—

A commonwealth of nations, in prospects proud to vie
With all the proudest empires beneath old Europe's sky;

From his new land arising to face the setting sun,
And flourish when the races of great old States were run?

Stretched low upon a pallet in Leon's noblest town
A wreck of human greatness had settled slowly down;

Worn out with woes and sickness, the wreck of what had
been,
The greatest of all seamen the world had ever seen—

He who to Spain had given a fairer realm of land
Than all the Kings in Europe could gather to their hand,

A tried and faithful servant—to serve his liege no more,
Had drifted down the lee-tide upon a shadowy shore:

Where Austrians and Spaniards and Flemings there were
none,
Nor Empires of the Indies, nor Duchies of Bourgogne,

THE CENTENNIAL GENERAL CONVENTION OF THE AMERICAN EPISCOPAL CHURCH.

I.

BY THE RT. REV. WILLIAM STEVENS PERRY, D.D., BISHOP OF IOWA.

A SINGLE sheet of foolscap, faded and yellow with age, still preserved among the archives of the General Convention, contains the records of the preliminary gathering of clergy and laity at New Brunswick, N. J., in May, 1784, out of which grew not only the independent organization of the American Episcopal Church, but also the successive "General Conventions" which, for a hundred years, have been triennially assembled to legislate for a Church whose boundaries are now coterminous with those of the nation. These minutes, dated Tuesday, May 11th, 1784, are without preface or signature, but they bear the written attestation of the venerable William White that they are in the handwriting of the Rev. Benjamin Moore, of Trinity Church, and afterward Bishop of New York. They are appended to the records of a meeting of the Corporation for the Relief of the Widows and Orphans of Clergymen of the Church of England in Pennsylvania, New Jersey and New York. They are brief and informal. The chief action they record is the appointment of a committee to secure, if possible, in their efforts for the revival of the Episcopal Church in America, the co-operation of the clergy of Connecticut, who, to the certain knowledge of some, tho not all, who were present at New Brunswick, were waiting the result of an application abroad for the consecration of their Bishop-elect, Samuel Seabury. This committee was instructed to solicit the concurrence of the Connecticut clergy "in such measures as may be deemed conducive to the union and prosperity of the Episcopal churches in the States of America." With this action and the appointment of a Committee of Correspondence "for the purpose of forming a continental representation of the Episcopal Church and for the better management of the other concerns of the said Church," these simple records close.

The "continental representation of the Episcopal Church," desired by the New Brunswick meeting, was well-nigh accomplished by the gathering in New York the following October of representatives, clerical or lay, from Massachusetts and Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware and Maryland, with a visiting, tho unaccredited delegate from Virginia. This assembly of clergy and laity formulated certain "fundamental principles" as the basis of a general ecclesiastical constitution, the first of which provided "that there shall be a general convention of the Episcopal Church in the United States of America." It was an age of conventions and constitutions, and the men who concerned themselves in these and subsequent efforts for the organization and perpetuation of the Church of their baptism, were among the leading spirits of the times. Of the clergy gathered in New York at this October Convention, four became bishops of the American Episcopal Church, and three others were bishops-elect. Of the laity, who at this time or a little later showed their interest in attending the councils of the Church general, or in their respective States, we might name the leading jurists, statesmen, diplomats of the day. The convention journals of this period of the history of the American Episcopal Church contain the names of men such as John Jay, Elbridge Gerry, William Samuel Johnson, Robert Morris, Francis Hopkinson, John Blair, Charles Cotesworth Pinckney, the Rutledges, and others equally or even more renowned in the halls of Congress or on the field of battle.

The "General Convention" called for by the first "Fundamental Principle" adopted in October, 1784, assembled in Philadelphia in September and October, 1785. There were no representatives from the churches in New England. Prior to the Philadelphia meeting, the apostolic Seabury had on the 14th of November, 1784, in an "upper room" in Aberdeen, received the Episcopal office at the hands of the Scottish Bishops, and on his return to America had been welcomed by the clergy and laity of Connecticut and received as Bishop by the churchmen throughout New England. With a Bishop at their head, the clergy of Connecticut, who had not from the first admitted the laity to their councils, proceeded to organize and develop their Church on what they deemed primitive and apostolic principles. The New England churches generally sympathized with these views, which were shared by not a few of the clergy and laity of the Middle and Southern States as well.

The lack of representatives from New England at the Philadelphia Convention of 1785 was made up in a measure by the presence of accredited delegates from Virginia and South Carolina. The "Fundamental Principles" of 1784 were, with a single exception, affirmed. An Ecclesiastical Constitution was prepared. The liturgy was revised, not alone, as was originally intended, in those respects affected by the changed condition in civil affairs, but to such an extent as to peril the very catholicity of the Book. An address to the English Archbishops and Bishops was agreed upon and signed by the Convention, praying for the gift to the American churches of the Episcopate in the English line of succession. At the close of the Convention the revised Liturgy

was publicly read in Christ Church, by the Rev. Dr. White, and a sermon suited to the occasion preached by the Rev. Dr. William Smith the leading spirit in this revision; and shortly after the Convention rose, the "Proposed Book" as it has always been styled, made its appearance, the committee of preparation and publication having been the Rev. Drs. William Smith, of Maryland, William White, of Pennsylvania, and Charles Henry Wharton, of Delaware. The "Proposed Book" proved a failure. The various State Conventions either demanded radical changes or amendments, or refused to accept the work at all. Its use was but temporary and local, and the question of its ratification was not even mooted at the subsequent Conventions. Crude and un-catholic tho it was, it was re-issued a few years since, and made the basis of the Prayer Book of the Reformed Episcopal Church.

The ecclesiastical Constitution, drafted at the Philadelphia Convention of 1785, provided for the meeting of a General Convention the following year. There assembled on the 20th of June, 1786, in Christ Church, Philadelphia, the clerical and lay representatives of the churches in the Middle and Southern States, who organized by the choice of the Rev. David Griffith, of Virginia, Washington's friend and rector, as President, and the Hon. Francis Hopkinson, a signer of the Declaration of Independence and the author of "Hail, Columbia!" as Secretary. In the interval which had elapsed since the rising of the late Convention, there had been a marked reaction developed in the direction of a greater conservatism, and the radical tendencies which had been so abundantly displayed in 1785 were now generally deprecated. Bishop White, in his "Memoirs," informs us that "the Convention assembled under circumstances which bore strong appearances of a dissolution of the union, in this early stage of it."

There was reason to fear that the measures taken the preceding year would hazard the success of the application to England for the consecration of bishops in the English line. The reply of the Archbishops was anxiously awaited, and its receipt, just before the meeting in 1786, afforded no little encouragement to those who were seeking the complete organization and perpetuation of the Church on primitive and historic lines. It was evident from the guarded language employed by the English prelates that the proceedings of the Convention of 1785 were regarded in England with alarm. The address to the Archbishops and Bishops from the Convention, originally drafted by Dr. William Smith, the Bishop-elect of Maryland, and modified by the celebrated John Jay, of New York, was carefully adapted to allay these fears and to assure the English prelates that the American churchmen "neither have departed, nor propose to depart, from the doctrines," "faith and discipline," of the Mother Church. To emphasize these assurances the Convention of 1786 proceeded to amend the draft of the Ecclesiastical Constitution in those matters which had elicited the most adverse criticism. By the new articles now introduced and the changes in the old now adopted, it was carefully provided that "a bishop shall always preside in the General Convention, if any of the Episcopal Order be present." The anomalous condition of things by which all clergymen, bishops included, were "amenable to the authority of the Convention" . . . "so far as relates to suspension or removal from office," which had been universally regarded as degrading, both the clerical and the Episcopal office was modified by the provision that "at every trial of a bishop there shall be one or more of the Episcopal Order present, and none but a bishop shall pronounce sentence of deposition or degradation from the ministry on any clergyman, whether bishop or presbyter, or deacon." The requirement for the use of the "Proposed Book" was also modified. In place of being enjoined, its use was simply permitted "until further provision is made in this case"; and the form of subscription prior to ordination changed, all reference to this Book being removed. The presentation of a strongly conservative and churchly memorial from the Convention of New Jersey, in which the radicalism of the previous General Convention was freely and unsparingly criticised, contributed in no little degree to the change of sentiment so plainly observable in these modifications of the measures adopted in 1785, and as we learn from no less an authority than Bishop White, "was among the causes which prevented the disorganizing of the American Church." The Rev. Thomas Bradbury Chandler, D.D., the first Bishop-designate of Nova Scotia, and the friend and correspondent of Seabury, has been credited with the composition of this important document. From evidence recently brought to light, it would appear that the Hon. James Parker, of Perth Amboy, N. J., had at least a share in the composition of this paper if, indeed, it was not wholly from his pen.

The Convention adjourned to meet on call of the Committee of Correspondence at Wilmington, Delaware, should the letter from abroad warrant such a meeting. The anticipated contingency was not long delayed, the letter from the Archbishop came to hand soon after the rising of the Convention. It expressed in unambiguous terms the "concern" of the English prelates "that if the essential doctrines of our common faith were retained, less respect, however, was paid to our Liturgy

than its own excellence and" the "declared attachment to it, had led" them "to expect." The Archbishops declared their "grief" that "two of the Confessors of our Christian faith, respectable for their antiquity" had "been laid aside." Complaint was made of the omission of an article in the Apostles' Creed "inserted, with a view to a particular heresy, in a very early age of the Church," and having had ever since "the venerable sanction of universal reception." The Eighth Article of the Constitution was faulted as "a degradation of the Clerical, and still more of the Episcopal character." At the same time the letter gave abundant evidence of the purpose of the Archbishops and Bishops of receiving satisfaction with reference to the matters complained of, and when in possession of sufficient testimonials as to the "virtuous life and sound faith" of those recommended for consecration, to communicate to the American churches the boon of the Episcopate on the English line. Accompanying the formal communication was a brief note from the Archbishop of Canterbury closing with the significant words, "whether we can consecrate any or not, must yet depend on the answers we may receive to what we have written."

The adjourned Convention met on the 10th of October. Its session lasted but two days. "An Act" was adopted by the Convention, declaring its "stedfast resolution to maintain the same essential Articles of Faith and Discipline with the Church of England," and proceeding to restore to the Apostles' Creed, the Article, "He descended into Hell"; to replace the Nicene Creed, and modifying the form of subscription contained in the Tenth Article of the Constitution, so as to prevent embarrassment where the Conventions of the States had in consequence of the objections of the English prelates "suspended the ratification and use" of the "Proposed Book." These changes, with two slight alterations in the Preface, and the Fourth Article of Religion, rendered necessary by the preceding action, were thus adopted and the Convention proceeded to sign the testimonials of the Rev. Dr. William White, Bishop-elect of Pennsylvania, the Rev. Dr. Samuel Provoost, Bishop-elect of New York, and the Rev. Dr. David Griffith, Bishop-elect of Virginia. The testimonials of the Rev. Dr. William Smith, elected as far back as 1783, Bishop of Maryland, were rejected, and the Doctor, tho present at the Convention, was deprived of his vote on the ground then taken that a clerical or lay delegate only could not represent the Church in a State. Never in the history of the American Church were more momentous matters disposed of than those which in October, 1786, were decided by the vote of a score of clergymen and laymen in the brief space of two days.

The consecration of Drs. White and Provoost took place on the 4th of February, 1787, at Lambeth Chapel, the coveted succession in the English line being communicated by the laying-on-of-hands of the Archbishops of Canterbury and York, the Bishop of Bath and Wells, and the Bishop of Peterborough. It was thus after years of disappointments and delays that the "struggle for the Episcopate" in the English line of succession was ended. There was at length in the United States, in the persons of the Bishops of Connecticut, Pennsylvania and New York, the canonical number requisite for the transmission of the historic Episcopate—a "college" of Bishops representing the Scottish and English lines of descent.

IS THERE FINAL CAUSE IN EVOLUTION?

BY JAMES M. COSH, D.D., LL.D.

It is very generally admitted by evolutionists, by none more fully than Professor Huxley, that the theory of Evolution does not undermine or interfere in any way with the doctrine of Final Cause. The adaptation of one object or agent to another and their co-operation to accomplish a good end, to give a life and plan to the plant and comfort to the animal, are fondly believed by the great body of mankind to be a proof of design and of a designing mind. Nor is the force of the argument lessened by the circumstance that the skillful structures have been inherited. If man could produce a machine which not only does its work, say a watch to keep time, but genders another machine of a like kind with itself, every one would be impressed with the ingenuity of the structure. So the very circumstance that a plant and animal can reproduce another plant and animal is an evidence of a more far-sighted design. Evolution does not lessen the force of the teleological argument. The question is started, May not the union and conspiracy of forces involved in Evolution furnish new proof, as it certainly supplies new illustrations, of purpose and ends?

As there are still so many unfilled-up gaps in the evolutionary process, I would speak on the subject cautiously and with reserve. At the present stage of investigation I would not employ an argument from Evolution as furnishing the clearest and most convincing proof of the existence of God. But surely those of us who believe in God on other grounds may trace in the development of Nature evidence of his wisdom and goodness. We see proofs of purpose and skill in Nature as it now presents itself to us, and we can connect this with the mode of production of the objects and we find the two, the present condition and past history, shedding light on each other. It is pleasant to think that when a new series of

facts has been discovered reaching over thousands of ages, they teach the same lessons as the old facts which pressed themselves on the attention of our forefathers. We see that contemporaneous Nature fits in beautifully to successive Nature as it is unfolded in the ages. Evolution, like geology, was at first looked upon with suspicion by religious people. But geology has come to be a strengthener of faith as it displays new instances of design, and is confirmatory of Scripture as showing that creation has proceeded by epochs like the days of Genesis. Already we see that there is a wonderful plan not only in the present state of the vegetable and animal worlds, but in the method of their production by evolutionary causation.

We see evidently in Nature certain subordinate ends planned and executed always under the highest end the manifestation of the wisdom and goodness of God to the contemplation of the intelligent creation. One of these is the wide scattering of seeds, and the preserving and the advancement of species. God, as it were, says to the plants and animals, "Be fruitful and multiply and replenish the earth." The science of Evolution has shown that these ends are accomplished in the most effective manner by Natural Selection and the other evolutionary instruments such as the surroundings of the living creature, the use and disuse of organs, and in the case of animals the exercise of intelligence. These all tend to the spread of order and ends. In particular, Natural Selection, with its consequent, "the survival of the fittest", is a most beneficent provision. All the new organs have a use, are produced because they have a use; they continue as long as they are useful and they commonly disappear when they have no longer a purpose to serve. Evolutionists are speaking and writing constantly of the use and usefulness of organs. Even those who have no belief in an intelligent use are obliged to employ the language to express the fact and this because the fact exists. I could quote multitudes of passages to this effect from our most determined evolutionists, including Darwin and Spencer. Dr. Wallace sums up:

"The shape, the size and the colors of the petals, even the specks and spots with which they are adorned, the position in which they stand, the movements of the stamens and pistils at various times, especially at the period of and just after fertilization, have been proved to be strictly adaptive in so many cases that botanists now believe that all the external characters of flowers either are or have been of use to the species."

Wallace delights to trace such use, and has illustrated very specially three useful agencies employed in the development of plants and animals.

1. There is *means for scattering seeds and fertilizing plants*. Some of these have been noticed with wonder and admiration from an ancient date. Seeds are carried by winds all around, sometimes to immense distances, perhaps hundreds of miles. They have been transported across seas, on rare occasions, from one hemisphere to another. Often the seeds are downy, so that they are easily wafted through the air. We have all observed that some of them have curious hooks to attach them to objects, or they possess adhesive matter whereby to cling to positions where they can germinate.

But of late years attention has been called to a very curious means of propagating plants. Birds and insects, such as bees, wasps and butterflies dip into flowers and fruits for nectar, honey and other kinds of food, and, as they do so, the seeds adhere to them and they bear the seeds to other plants, which they fertilize. It is pleasant to see the insects flitting from flower to flower, sipping sweets for themselves, but our pleasure is increased when we find them at the same time carrying on unconsciously a work necessary for the preservation of the economy of Nature. Some plants are self-propagating and do not need the aid of these carriers, but others have no means of self-fertilizing and are dependent for the continuance of the species on the creatures which feed upon them, and are busy, without their meaning or knowing it, in carrying the fertilizing power from plant to plant. Naturalists tell us that plants generally are benefited by cross fertilizing; it is in this way that new forms of beauty are produced, as we see in roses, in pansies and innumerable plants in our gardens, in the fields and on the mountains. This work is conducted largely by birds, butterflies and flying insects, which thus make plants fulfill their offices and cover the earth, to give animals their food and show their beauty to man, if he will only appreciate it.

2. There is *mimicry as a means of preserving plants and animals*. This is a very curious subject. Naturalists have been led to take special notice of it of late years. Edible animals and plants liable to be attacked as prey, take the form of inedible creatures which devouring birds and insects are careful to avoid. Wasps and bees, which can defend themselves by their stings, are often imitated by insects of other orders which are thus saved from destruction. Certain harmless snakes mimic poisonous species, and are thus preserved. A butterfly has been known to take the form of a snake with a threatening aspect and thus frighten its foes. It is said that the Kallima butterfly of India, as it rests on a twig can scarcely be distinguished from a colored leaf. The British cuckoo is a very defenseless bird, but in color and markings is much like a sparrow-hawk, and is, therefore, not likely to be attacked. Let us understand precisely what these provisions mean. They amount to this,

that defenseless creatures are more apt to be preserved by their resembling others which as known to be able to meet their assailants are not apt to be assailed. It does look as if the species which have this property of mimicking, are more likely to be preserved in the struggle for existence and go down to future generations. The most remarkable cases are those which are protected by color, and instances will be given under the next head.

3. There is *color as a means of recognition and defense*. This is a fresh topic. Wallace has devoted to it several chapters, which are, perhaps, the most interesting and original parts of his work.

Following physicists generally, he regards color as altogether subjective. In this I think he is mistaken. Color, like heat, which is a mode of motion, is an external cause of an organic affection. As such it has an objective existence. I do not say what precise sort of existence. I believe it exists, as a power or powers. According to the doctrine of Newton, when the white beam strikes on a plant it is divided into two parts, one part is reflected by the color of the surface and the other is absorbed. While taken into the plant it is not lost—according to the doctrine of the conservation of energy no force is ever lost. It may abide for a time in the plant, till it is changed into some other form. Being in the plant, it is apt to come out in a complementary color. We have thus, as I have shown, in plants and also in shells, insects, moths, butterflies and birds, sets of complementary colors, which are harmonious, which are thus gratifying to the eye of animal and man who is attracted toward them.

Wallace shows that colors are most apt to come out on the parts of the plant and animal in which there is the most active vitality—the vitality, commonly chemical action, drawing the color absorbed in the plant toward the part. "Color has arisen over surfaces where muscular and nervous development is considerable." The crown of the head, the throat, the ear-coverts, the eyes, and, I may add, the plumes have usually distinct tints in all highly colored birds.

Color in the animal kingdom is an influential means of recognition, perhaps more than even form. It is by its marking and its hues that animals readily recognize their kin of the same species, that the bird discovers its mate, that the female spies the male. Some birds will not pair with a bird of a different color, even tho' it be of its own species. There are special "markings, bands, spots or patches of white or of bright color which vary in every species—and are often concealed when the creature is at rest, but displayed when in motion—as in the case of the bands and spots so frequent on the wings and tails of birds. Now these specific markings are believed, with good reason, to serve the purpose of enabling each species to be quickly recognized even at a distance by its fellows, especially the parents by their young, and the two sexes by each other; and this recognition must often be an important factor in securing the safety of individuals, and therefore the well-being and continuance of the species."

Wallace adds:

"The most common of all the characters by which species are distinguished from each other, their colors and markings can be shown to be adaptive or utilitarian."

Wallace is inclined to think that easy recognition "has had a more widespread influence in determining the diversities of animal coloration than any other cause whatever." Color is a *means of protection*. Some colors are attractive and draw attention to the plant or animal, others are a warning or a signal flag against attack.

Birds, butterflies and insects are apt to take the color of the ground or food on which they live. Birds in the Arctic regions are commonly white, so that they are concealed in the snow. The raven in the same region retains its black color because it is "a powerful bird and fears no enemy, while being a carrion feeder it has no need for concealment in order to approach its prey." In the rich vegetation of the tropics many birds, such as parrots and paroquets, are apt to take a green color, and so are not distinguishable. But as they need to be discerned by their mates, birds in tropical forests have usually small but brilliant patches of color. The pale color of birds prevalent in sandy and arid districts is in harmony with the general tints of the surface. In the case of many birds the eggs are so like the surroundings that it is difficult to distinguish them at any distance. In decaying vegetation the eggs are apt to be spotted, but not brilliantly. Those who hunt tigers and panthers tell us that it is often difficult to see them at any distance in the midst of the grass and under the trees. Wallace says the earliest leaf-eating insects acquired a green color as one of the necessities of their existence. Those feeding on particular species would speedily acquire the peculiar tints and markings best adapted to conceal them upon these plants. We have all noticed how insects are apt to take the colors of the plants on which they feed.

"It seems not improbable that fully one-half of the species in the animal kingdom possess colors which have been more or less adapted to secure for them concealment or protection."

It is of vast importance, in order to preserve the species, that birds should be protected while hatching. From our childhood we have been interested to observe how this has been effected by their nests, often curiously con-

structed, being concealed in thick foliage or in holes. But there is another very powerful provision to secure the same end, while the male has often a showy coloring to attract the female, the female has often a tamer color to keep her unobserved. There are cases in which the male has the plainer coloring, but in these he sits on the eggs and the female fights the battles.

We could mention vast numbers of different kinds of color-concealment, but it will suffice to specify only a few. There are birds which lay their white eggs in open nests.

"All the duck tribe, the grebes and the pheasants belong to this class; but these birds all have the habit of covering their eggs with dead leaves or other material whenever they leave the nest, so as effectually to conceal them. Other birds, as the short-eared owl, the goat-sucker, the partridge and some of the Australian ground pigeons lay their white or pale eggs on the bare soil, but in these cases the birds themselves are protectively colored, so that when setting they are almost invisible, and they have the habit of sitting close and almost continually thus concealing their eggs. Pigeons and doves offer a very curious case of the protection of exposed eggs. They usually build very slight and loose nests of sticks and twigs, so open that light can be seen through them from below, while they are generally well concealed by foliage from above. Their eggs are white and shining; yet it is a difficult matter to discover from beneath whether there are eggs in the nest or not, while they are well hidden by the thick foliage above."

Briefly:

"The white of arctic animals, the yellowish tints of the desert forms, the dusky hues of crepuscular and nocturnal species, the transparent or bluish tints of oceanic creatures, represent a vast host in themselves; but we have an equally numerous body whose tints are adapted to tropical foliage, to the bark of trees, or to the soil, or the dead leaves, on or among which they habitually live. Then we have innumerable special adaptations to the tints and forms of leaves or twigs or flowers; to bark or moss, to rock or pebble, by which such vast numbers of the insect tribes obtain protection; and we have seen that these various forms of coloration are equally prevalent in the waters of the seas and oceans, and are thus co-extensive with the domains of life upon the earth."

Mr. Darwin first stated that flowers had been rendered conspicuous in order to attract insects which carry the seeds to fertilize plants. If insects had not been developed on the earth our plants would not have been decked with beautiful flowers, but would have produced only such poor flowers as we see in our fir, oak and ash trees, on grasses, docks and nettles, which are all fertilized by the agency of the wind.

This coloration must have a physical cause, as I am endeavoring to show that it has a final cause. It is of importance that we should distinguish these two. Efficient cause is the power which produces the effect. Final cause is the end or purpose contemplated by a combination of agencies. When Napoleon Bonaparte employed a body of trained soldiers to fight the enemy this corresponds to efficient cause. When he directed and combined the soldiers to gain a victory we have what corresponds to final cause. In this article I am seeking for final cause. In due time science will discover what is the objective nature of color which makes certain animals assume the color of the ground on which they live; and then we shall have efficient cause.

Wallace does not always clearly distinguish between these two kinds of causes. In giving explanations he often writes as if he had found an efficient when he has only found a final cause. Weismann is most anxious to show that in seeking to discover physiological causes he also finds final cause, tho' he has not always been able to explain his meaning as distinctly as a metaphysician can. Writers on natural theology, such as Paley, have shown that material causes combine to give an easy movement to the joints and muscles of the frame. I believe that Evolution is taking a farther step and showing how selection, combination and other processes unite and cooperate to protect, expand and beautify plants and animals and make them fulfill the end of their existence.

We are led naturally and spontaneously to discover use, fitness, proportion, harmony, in the plant and animal kingdoms. We are led as naturally and necessarily to ask, How has all this order been produced among materials which are themselves so varied and scattered? It is clear that while God acts in all his works, he acts by means and in means. We may, we should, reverently inquire what these means are, and we find them to be second causes under the first great cause, specially the evolutionary processes which are at present being disclosed to our view. In these we are constrained to discover means accomplishing a high end, and surely this is a conclusive and decisive mark of intelligence and wisdom. I would as soon believe that all is chance in the collection of grand paintings in the Pitti Gallery as that these lovely forms and colors and structures of plants and animals are not the product of an infinite intelligence.

In this article I have simply opened up a new and interesting field; others will enter in and possess it. It must evidently be the main topic of discussion in the theology of Nature in the age to which we have now come. It is to be hoped that naturalists, biologists and divines will soon come to a definite understanding as to what is the meaning and interpretation of these developing facts now disclosed to our view.

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