

## PART IV.

### NEWLY DISCOVERED NATURAL LAWS REGULATING THE RESEMBLANCE OF PROGENY TO PARENTS.

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#### SECTION I.

##### LAWS OF RESEMBLANCE.

WE are told by Dr. Pritchard, that, "The children of the same parents, though often bearing a general resemblance, yet exhibit always some difference, and frequently a considerable diversity in these respects." To account for this apparently capricious variety, is not what we attempt. That *there must be a sufficient reason why each individual figure should assume its own precise character*, rather than any other, is not to be doubted, but *the causes which predetermine it, seem to be beyond the reach of human sagacity*, or at least they will never be discovered, until the details of general physiology, and the theory of generation in particular, shall be much better understood, than they seem likely ever to be.—Such assertions have probably preceded all new observations, however simple. That

they are discouraging and mischievous, is evident. That they are untrue, I shall endeavour to show in the sequel.

An imperfect outline of this Section appeared in the London Medical and Surgical Journal, for 25, May, 1833. It was reprinted with additions, in March, 1837, as a pamphlet, with the title, "Influence of Natural Beauty, and its Defects, on Offspring; and Law Regulating the Resemblance of Progeny to Parents; circulated (privately) in order to obtain information from those who have the means of observing, in furtherance of a work on this subject."

Some facts are now to be described, which are certainly amongst the most curious and interesting of those which appear to have escaped the notice of philosophic observers.

This is the more surprising, as it requires but little analytical power to detect them,—as, when observed, they appear to be of the simplest description,—and as the regularity of their sequence is such that they appear to tend to general laws.

*These laws regard the mode in which the organization of parents affects that of children, or regulates the organs which each parent respectively bestows—the mode in which like produces like.*

Among animals, the mere effects of these laws have been observed to take place; but the laws themselves, on which these defects depend, have in no case been defined; nor, consequently, have they been applied to, or observed to operate among, mankind.

So little have these laws been thought of among breeders, that my correspondent \* \* \*, in a letter of

the 21, March, 1837, says, "I doubt much whether the breeders of domestic animals can give you any information : the points of shape to which you refer are considered by them so entirely matters of indifference, that they never attend to them at all." And, in one to Dr. Birkbeck, of the 4, February, he says, "I should doubt whether the experiments which have been made with the view of improving the breeds of domestic animals can bear any very close analogy to the effects of intermarriages among mankind." Knowing, however, the uniformity and simplicity of natural operations, the value of comparative anatomy, and the strict dependence of physiological action on anatomical structure, it was impossible to be discouraged.

These laws were discovered by observation turned to the subject, in the conviction that some such laws must exist. As, however, they ascend to, and have their origin in, the structure and functions of the body, it is evident that, in an attempt to communicate a knowledge of them to others, a very brief view of such structure and functions—the proper objects of anatomy and physiology—will facilitate their explanation. That brief view, which is itself original, is given under the title of PRELIMINARY, at the beginning of the work ; and *the reader is entreated to make himself master of it, in order to facilitate his understanding the whole of the sequel.* The task is but a short one.

By some physiologists, the influence which intermarriages exert over the forms of mankind, has been overrated. Mr. Lawrence says, "Connexions in marriage will generally be formed on the idea of human beauty in any country ; an influence this, which will

gradually approximate the countenance towards one common standard. If men, in the affair of marriage, were as much under management as some animals are in the exercise of their generative functions, an absolute ruler might accomplish, in his dominions, almost any idea of the human form."

Cabanis more correctly says, "It cannot be doubted that, in the human race, improved as it may be by a long physical and moral culture, particular traits will still distinguish individuals, as they distinguish the individuals among inferior animals which we have so highly improved."

Cabanis was not aware that he might have asserted much more than this. I have, I believe, established the truth that, *in the propagation of organs from parents to children, organization is nearly indestructible*; for it may often be seen that neither nourishment entirely derived from the mother, nor climate, nor education, diminishes an original resemblance to the father.

Each parent, nevertheless, communicates a distinct series of organs; and the only modifications which the organs communicated by either parent undergo, are chiefly, if not altogether, such as are necessary to harmony of action with those communicated by the other parent, and such as are produced by difference of sex.



## I. LAW OF SELECTION,

WHERE BOTH PARENTS ARE OF THE SAME VARIETY.

1.—*Organs Communicated by One Parent—the Anterior Series.*

In this case, ONE PARENT COMMUNICATES THE ANTERIOR PART OF THE HEAD,\* THE OSSEOUS OR BONY PART OF THE FACE, THE FORMS OF THE ORGANS OF SENSE, (the external ear, under lip, lower part of the nose, and eyebrows being often modified,) AND THE WHOLE OF THE INTERNAL NUTRITIVE SYSTEM (the contents of the trunk, or the thoracic and abdominal viscera, and consequently the form of the trunk itself, in so far as that depends upon its contents.)

The resemblance to that parent is consequently found in the forehead and the bony parts of the face, as the orbits, cheek-bones, jaws, chin and teeth, as well as the shape of the organs of sense, and the tone of the voice.

2.—*Organs Communicated by the Other Parent—the Posterior Series.*

THE OTHER PARENT COMMUNICATES THE POSTERIOR PART OF THE HEAD,† THE CEREBEL SITUATED WITHIN THE SKULL IMMEDIATELY ABOVE ITS JUNCTION WITH THE BACK OF THE NECK, AND THE WHOLE OF THE LO-

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\* And, I believe, the upper middle part also.

† And, I believe, the lower middle part also.

COMOTIVE SYSTEM (the bones ligaments and muscles or fleshy parts.)

The resemblance to that parent is consequently found in the back head, the few more moveable parts of the face, as the external ear, under lip, lower part of the nose, eyebrows, and the external forms of the body, in so far as they depend on the muscles, as well as the form of the limbs, even to the fingers, toes, nails.\*

*Explanation of the Accompaniment of Particular Organs, in each of these two Series.*

It is clear that the whole *nutritive system*, chiefly contained within the trunk, is naturally connected with the *senses of taste and smell*, which are the guides to the supply of its wants as to food and drink; and therefore the senses contained in the face (and consequently the observing faculties dependent on these senses and contained in the forehead) ought to accompany the nutritive system.

It is equally clear, that the whole *locomotive system*, is naturally connected with the *cerebel or organ of will*, on impulses from which all the motions of that

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\* Several circumstances indicate that, with this series of organs, go the skin and its appendages. These have evidently much affinity with the osseous system. Not only does the skin become horny from pressure, but hair, bristles, spines, scales, nails and horns are its productions, (the bony and the skinny system often uniting in horns:) and in many inferior animals, as the crustacea, it becomes shelly and serves the purpose of bones. If moreover it be true that the offspring of a black man and a white woman are darker than those of a black woman by a white, this must be because, in a cross, the male gives the locomotive system, and because the skin and its colour go along with it.

system depend ; and therefore the backhead containing both the organ of will and the posterior masses of brain—the seats of desire or aversion by which will is excited, ought to accompany the locomotive system, not merely in the greater masses of the figure, but even in the muscles of the face.

NOTE FOR THE PHYSIOLOGIST.—This invariable accompaniment of the CEREBEL by the locomotive system, gives further confirmation of the great truth, that volition, or the power which actuates the locomotive system, is the function of the cerebel ; as first pointed out by me in “Preliminary Lectures,” published in 1808, the year before it was noticed by Rolando. It also shows the error of those who, falsely supposing the *posterior* columns of the spinal cord to be those of *sensation*, are driven, like Sir. C. Bell, Dr. Pritchard, M. Foville, &c., to regard the cerebel, from which these columns proceed, as an “organ of sensation !” Thus Dr. M. Good asserts that “the nervous filaments of the muscles are of two kinds, *sensific* and *motific*, the *former* proceeding from the *cerebellum*, or the *posterior trunk* of the spinal chord to which it gives rise, and the latter from the cerebrum, or the *anterior trunk* of the same double chord.” But there neither is, nor can be, any other organ of sensation than those of the senses. *Sensation* is not repeated in the encephalon ; and it becomes *perception* in the cerebrum, not in the cerebel. That the latter is the organ of volition or will, is proved, moreover, by every observation ; and it follows that the posterior columns are columns of volition.—The assertion, that the ANTERIOR COLUMNS are those of volition, is no more proved

by muscular motion ensuing when they are irritated, —than the nerves of the skin or of the tips of the fingers, are proved to be nerves of *volition*, because when pricked, these parts are instantly withdrawn. Sensation, conscious or unconscious, must precede all animal motion. Neglect of this truth led Bell and Magendie to invert the doctrine, that “the *anterior* columns are those of *sensation*, and the *posterior* those of *volition*,” first published by me in “Archives of Science” in 1809, long before these men dreamt of such a thing; as reference to that work and to theirs will prove. They and their followers are now in the awkward position of finding that the posterior columns, falsely supposed by them to be those of *sensation*, are connected with the cerebel, which no ingenuity of theirs will ever show not to be the organ of *volition*! *This foolish position will soon set the matter right*—But I will fully expose this in an “Introduction to the Nervous System,” in which also I will notice Dr. Fletcher’s numerous and liberal criticisms on my work of the “Nervous System;” as well as the *new discovery* of Mr. Solly! *vouched to be so* by Mr. Owen and Mr. Mayo!! and *received as such* by the Royal Society!!!

*Either Parent may give either Series.*

As to the communication of organs from parents to progeny, our knowledge has hitherto been indefinite and vague; and my correspondent \* \* \* \* (21, March\*) says, generally, “The male and female ap-

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\* Henceforward the dates of communications are thus briefly indicated.



pear to have, on the average, an equal influence upon the form of the progeny. Some males transmit their likeness to their produce more than others, while some females breed similar animals, though put to a variety of males. I am, of course, not speaking of cross breeds."

Mr. Knight (16, April) rather more definitively says, "Respecting the influence, comparatively, of the male parent and the female one, that of both is very nicely balanced, where both parents are of the *same variety*, and *similar in size and habit to each other*."

It is a fact established by my observations, that, in animals of the same variety, *either the male or the female parent* may give *either series of organs* as above arranged—that is *either* forehead and organs of sense, together with the vital and nutritive organs, *or* back-head, together with the locomotive organs, as will forthwith appear.

#### *Slight Illustrations.*

These, though imperfect, (for I have had no opportunity of personally examining their subjects,) are selected on account of their being extensively known, and therefore readily satisfying the minds of most persons as to the truth of the law which has just been enunciated.

The QUEEN, as daughter of the Duke and Duchess of Kent, resembles her MOTHER generally in the *anterior series* of organs, (see page 142,) and her FATHER generally in the *posterior series* of organs. (see page 142.) This is sufficiently indicated in Plate I., where







the slightest comparison will show that the Queen has the forehead of her mother, which is much superior in perpendicularity and capacity to that of her father; and that, on the contrary, she has his lower features, the nose and mouth in particular. Those two points indicate all the other organs which are associated in each respective series, as will further appear.

Engravings representing the heads of NAPOLEON, MARIA LOUISA, and their SON, at an early period, present the precisely opposite case, in which the FATHER gives the *anterior series* of organs, and the MOTHER the *posterior series* of organs.—Plate II. shows the son to have the high forehead of the father, and the thicker lips of the mother. That the son has the forehead of the father is proved, not only by its capacity, but by the horizontal line which, in both, it forms over the orbits and root of the nose, so totally different from that of the mother; and also by actual measurement. The original masks, both that of Napoleon, taken after death by Dr. Antomarchi at St. Helena, and that of his son, taken after death at Vienna, being in possession of Mr. F. Graves, of Pall Mall, he has most liberally permitted Mr. F. Howard to take sketches from them, and has also permitted me to take their dimensions. In both, the space from the depression immediately above and before the tragus of the ear, on one side, to the same point on the other, is nearly the same, whether the measure be carried over the surface which is immediately above the frontal sinuses in the father, and has the corresponding direction in the son, or whether it be carried two inches and a half higher upon the forehead. In the

first situation, its length in Napoleon is eleven inches and six-eighths, and in his son one-eighth more; and in the last situation, its length in Napoleon is twelve inches and five-eighths, and in his son two-eighths more. That the son has the developed and sensual lips of the mother, all good portraits show; and the mask also shows that he has her wide backhead, on which that developement depends. The diameter of Napoleon's head immediately above the ear appears to be five inches and seven-eighths; and that of his son is six inches and three-eighths. Thus the son's head vastly enlarges behind; and this, reacting on the forehead, slightly enlarges that, according to a rule which will forthwith be mentioned. The narrower, longer, and more intensely acting head of Napoleon is quite a contrast to that of his son, which never would have frightened the antiquated royalty and aristocracy of Europe, even if he had not, like his father, recruited their ranks.

Thus, these slight illustrations not only show that *each parent* communicates a *distinct series* of organs, but that *either parent* may communicate *either series*.

*Various Corroborations, both as to Man and Animals.*

To show that practical people have been struck with the accompaniment of *some* of the organs, I first restate the facts mentioned in the dedication; for dedications are sometimes neglected by readers.

I had no sooner announced to Mr. Knight this law, and brought before him a family exemplifying its operation, when the vast experience and observation

which has long placed him at the head of scientific breeders, enabled him to state to me a practical circumstance both as to man and animals, which at once corroborates every portion of the law.

He stated that if, in woman, he were shown merely a face, short and round, full in the region of the forehead, and having what are commonly called chubby cheeks, but contracted and fine in the nose and mouth, he would unhesitatingly predict the trunk to be wide and capacious, and the limbs to taper thence to their extremities: and so unfailing was this indication also in regard to inferior animals, that if, in adjudging a prize, there were brought before him an apparently well-fed animal of opposite form, or having a long and slender head, he would suspect it to be crammed for show, and, as such, should be disposed to reject it.\*

In this, his vast experience discovered a practical fact independent of all theory—a fact constituting an unerring guide in the most important decisions of husbandry—a fact of immense extent and bearing in its various relations.

His ready prediction of the capacity of the trunk from a view merely of the forehead and face—these anterior parts, is a proof of so much of the law as states that, with the form of the forehead and face, goes that of the nutritive organs contained in the trunk, for to these its capacity is adapted.

Regarded, moreover, even thus far, it leaves it as

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\* Mr. Knight (22, May,) says, "The same remark respecting long and slender heads and faces, applies alike to horses, sheep, hogs, &c."



probable, that the remainder of the law is equally well founded, namely, that, with the form of the backhead and cerebel—these posterior parts, goes that of the locomotive organs composing the rest of the body.

His beautiful observation, however, does much more than render this remainder of the law a mere probability.—I have shown in this work, that, with the dimensions of the backhead and cerebel, go those of the locomotive system, and consequently those of the more muscular and moveable parts of the face, the mouth and nose. The shortness and fineness, therefore, of the mouth and nose, mentioned in his observation, being concomitant effects of the same cause with the tapering limbs, become as sure an indication, not merely of such limbs, but of the small backhead and cerebel, as the short and round face with full forehead, were of the wide and capacious trunk. Thus, that observation confirms also the remainder of the law.

In a letter subsequent to that time, (22, May,) Mr. Knight says, “Respecting the connexion between short faces and plump bodies, amongst our cultivated animals, as you thought the fact important in support of some of your opinions, I think it will be well to cite the human species as an example; for no one can doubt that girls with short broad faces have more plump bodies, than those with slender oval faces, aquiline noses, &c.

“A dog having a long slender head and nose, with the body of a bull-dog, would be a strange looking animal, nothing similar to which has, I believe, ever

existed, and such a form of animal could not be obtained unless by long successive attention, through a great many generations, if it could at all be obtained, and, if it could be obtained, it would not be as hardy, constitutionally, as the ordinary bull-dog. Equal difficulty would occur in forming a breed of dogs with the body of the greyhound and the head of the bull-dog."

Mr. Knight, however, observes, that, among domesticated animals, he "never witnessed any difference in the influence of the male or of the female parent upon the forms of the heads of the offspring." The obvious reason of this is, that in horses, cattle and sheep, the form of the backhead and cerebel is hid by the great transverse ridge of the occipital bone, to which the large muscles which raise the head are attached; by these muscles themselves; and by the elastic ligament (*ligamentum nuchæ*,) which, without voluntary effort, assists the muscles in maintaining the position of the neck: in man, on the contrary, owing to his upright position, the head is greatly supported by resting on the vertebral column; large ridges, muscles and ligaments are not required; and the projection caused by the backhead and cerebel is perfectly obvious. Horses, cattle and sheep, therefore, show only the forehead and face; and their whole head consequently seems to go, undivided, along with the vital organs, in the trunk of the body.

Concealed, however, though the backhead is, in these animals, we have proof of its various developments, in the various developements of the muscular system, with which the former must always corres-

pond, and which at all events show what each parent communicates.

I should here observe that, in order to express the similarity between progeny and one of their parents, breeders often say "they have the same general shape or character." Now, as this general shape or character is always caused by the skeleton and locomotive system generally, I have often, to avoid all difficulty, asked merely "Which parent gives the general shape or character?" Being thus informed as to which parent gives the locomotive system or posterior series of organs generally, and knowing that the other parent always gives the vital system or anterior series of organs generally, the reply to that question answers every purpose.

Those of whom inquiries are made, are thus saved the trouble of attending to the anterior series of organs, which are less easily distinguished by all who begin such observations. Still, it is well to explain at least that the form of the face and the relative capacity of the trunk indicate those of the sensitive and vital systems given by the parent who does not give the shape.

Enlightened persons readily see this. Thus, to prevent mistake, my correspondent \* \* \* (11, January,) using his own terms, says, "I consider 'locomotive' to imply shape—bone and muscle, and 'vital' to imply the organs on which strength or weakness of constitution, disposition to fatten, &c., depend."\*

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\* That is the intestines, heart, blood-vessels—in short, all the tubular organs, as explained in the Preliminary.

Accordingly, in addressing to that correspondent the important question which is now under consideration—"When the male and female parent are of the same breed, does it not appear that either may give the locomotive system, the general shape or character to the progeny?"—his answer (and it is a very important one) was "YES. But the colour usually depends upon the male."

To show further that either parent among domesticated animals, may give either series of organs, I may quote the account of the ancon sheep.

An ewe produced a male lamb of singular proportion and appearance. His offspring, by other ewes, had, in many instances, the same characters with himself. These were shortness of the limbs\* and length of the body, so that the breed was called the otter breed, from being compared to that animal. The fore-limbs were also crooked, so as to give them in one part the appearance of an elbow, and hence the name ancon (from  $\alpha\gamma\kappa\omega\nu$ ) was given to this kind of sheep. They were propagated in consequence of being less able to jump over fences. "They can neither run nor jump like other sheep. They are more infirm in their organic construction as well as more awkward in their gait, having their fore-legs always crooked, and their feet turned inwards when they walk.

"When both parents are of the otter or ancon breed, their descendants inherit their peculiar appearance and proportions of form. I have heard but of

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\* Sir Everard Home found that the bone of the fore-leg in one of these sheep was larger, but no so long as that of a much smaller Welsh sheep.



one questionable case of a contrary nature.—When an ancon ewe is impregnated by a common ram, the increase resembles wholly *either* the ewe or the ram.\* The increase of a common ewe, impregnated by an ancon ram, follows entirely [in regard to shape of course] the one or the other, without blending any of the distinguishing and essential peculiarities of both.

*“Frequent instances have happened where common ewes have had twins by ancon rams; when one exhibited the complete marks and features of the ewe, the other of the ram. The contrast has been rendered singularly striking when one short-legged and one long-legged lamb, produced at a birth, have been seen sucking the dam at the same time.”*

As the short and crooked legs, or those of opposite form, here indicate the parent giving the locomotive system, it is evident that one of the twins derived it from one parent, and the other twin from the other parent,—the parent not giving it, doubtless communicating, in each case, the vital or nutritive system.

#### *Mode of verifying this Law, by examining Parents and Children.*

Every observer has the power of verifying these facts in nature.

With this view, the following scheme of the more or less dependent organs may be drawn out in two

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\* These last assertions, if not applied to shape alone, are evidently the results of imperfect observation. There are no instances of that kind in nature.



columns, over one of which may be written the word 'Mother,' and over the other the word 'Father.'

A copy of this scheme may be used in examining each child ; and the organs of the father and mother respectively, which the child does not possess, may be crossed out, so that, in the two columns, each part in general remains but one named.

## NAME OR INITIALS OF CHILD.

## PARTS LIKE THOSE OF THE MOTHER.

Forehead.  
Upper Middle Part of Head.  
Bony Parts of Face.  
Teeth.  
Digestive System, &c.  
Form of Eyes.  
*Eyebrows.*  
*Middle of Nose.*  
*Point of Nose.*  
*Upper Lip.*  
*Under Lip.*  
*Ears.*  
Backhead.  
Under Middle Part of Head.\*  
Glaber or Frontal Sinuses.  
Chest.  
Limbs.  
Fingers, Toes, Nails.

## PARTS LIKE THOSE OF THE FATHER.

Forehead.  
Upper Middle Part of Head.  
Bony Parts of Face.  
Teeth.  
Digestive System, &c.  
Form of Eyes.  
*Eyebrows.*  
*Middle of Nose.*  
*Point of Nose.*  
*Upper Lip.*  
*Under Lip.*  
*Ears.*  
Backhead.  
Under Middle Part of Head  
Glaber or Frontal Sinuses.  
Chest.  
Limbs.  
Fingers, Toes, Nails.

N. B. The parts of which the names are printed in italics are variable by the cerebel or organ of the will influencing the muscles more or less connected with them.

In examining a family, it is right to prefer the pa-

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\* That is, over the ears and towards the temples.

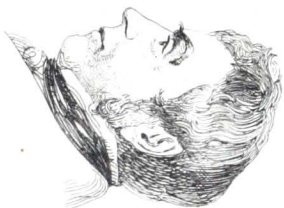
rents,—to understand first the organization of the mother in all the points mentioned in the columns ; 2ndly, to understand that of the father in these points ; 3rdly, to compare each of these points in one parent with the corresponding one in the other ; 4thly, to mark particularly the greatest differences between them—making allowance for the modifications always caused by difference of sex and age ; 5thly, to compare each corresponding point in the parent and child who appear to be the likeliest to each other, making the same allowance ; 6thly, to look in the other parent for the points which do not correspond in the first, still making that allowance ; 7thly, to bear in mind the influence which the more or less powerful action of each organ produces in another ; 8thly to examine the other children in the same way ; 9thly, not to be surprised if disagreements which are irreconcilable with the father's organization should sometimes occur.

As a GENERAL GUIDE IN SUCH OBSERVATIONS, it may be here noticed, that when the forehead and, considered generally, the face viewed in front, resemble one parent, the whole head viewed in profile will furnish the points of resemblance to the other parent, namely the backhead, the ear, the under lip, &c. The *front view* best displays the *observing faculties* ; the *profile view*, the *active ones*.

Plates III. and IV. exhibit these resemblances more in detail than in the previous illustrations. They exhibit a father, mother and two sons, both in front and profile ; and, if carefully examined in both these views, they show one son to have the forehead of the father and the mouth of the mother, while the other son has









the first of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The second of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The third of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The fourth of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The fifth of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The sixth of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The seventh of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The eighth of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The ninth of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

The tenth of the year, the weather was very cold, and the  
ground was covered with snow, and the wind was very  
strong, and the rain was very much.

the forehead of the mother with the mouth of the father ; the other parts connected with these respectively, in all points corresponding.

*Further Explanation of the Influence of the Posterior Series of Organs upon the Anterior Ones, and vice versa.*

In the parent who gives the anterior series of organs—the forehead, osseous face, eyes, &c., there is always a tendency to give even the parts which are marked as variable in the preceding table—the eyebrows, lower part of the nose, mouth, &c., because these belong to the organs of sense, which, as strictly such, and not as influenced by muscular action, are a most important portion of the anterior series. This tendency of these variable parts to conform to the more permanent anterior organs, may, indeed, be seen in almost every instance ; and some of them are often altogether conformable.

As, however, these variable parts belong not merely to the organs of sense as such, but have also muscles entering into their composition, and are so far organs, not of sense or impression, but of expression, their forms become altered by this cause. Hence alone their variability, and the fact that their forms are often partly tracable to the parent giving the anterior organs, and partly to the parent giving the posterior ones.

It does not follow, however, that when one of these variable parts is thus influenced by the action of the cerebel, or organ of the will, all are so influenced. The cerebel consists of various parts, called lobes, of which,

each appears to exert a specific action; and in that way it probably is, that one or two of the variable parts may be modified by it, while the rest conform to those of the parent giving the anterior organs. Thus either the eyebrows, or the lower part of the nose, or the under lip, may alone be altered.

Plates V. and VI. illustrate the influences now described. They exhibit a father, mother and two daughters, both in front and in profile; and, like the last plates, they show one child to have the forehead of the father, and the other to have the forehead of the mother. But, as the nose of the father is strongly marked, it is communicated to both children; and as the mouth of the mother is more developed, it is similarly communicated, as is well seen in the profiles.—These heads, moreover, show another interesting circumstance, namely, that the larger backhead of the mother causes an increased development of the head and of the forehead in particular, in one daughter; while the smaller backhead of the father causes a diminished development of the head and of the forehead in particular, in the other daughter. Hence one of these heads is vastly larger than the other. So powerful is the reaction of the backhead upon the forehead, as will afterwards be further shown.

This is the place to mention that, under all these changes, certain organs seem to go together, or to correspond in their forms. Thus I have often observed thick lips to be accompanied by thick or turned-in edges of the ears: the negro has both of these parts very thick; the monkey, both very thin. The forms of the nose and eyes appear also in some degree to











correspond. Nor are these correspondences unaccountable, since I have shown, in my work on THE NERVOUS SYSTEM, that the nose and eyes are more especially connected with emotion; and the mouth and ears, with passion.

As the cerebel thus exerts an influence over the moveable parts of the anterior series of organs, so one of the anterior organs influences the action of the muscles.

It is remarkable, that the parent who gives the locomotive system does not give the carriage and the manner of walking. These are always given by the other parent, who gives the organs of sense. Sensation would appear to be always the regulator of motion; and it appears to be the eyes in particular, which execute that function.

A very simple proof of this is obtained by shutting the eyes while we stand erect: the body is immediately, felt to vacillate and to be in perpetual danger of losing its balance, or rather to require distinct efforts to recover it; whereas, the moment the eyes are again opened, neither does vacillation occur, nor is correction necessary. It is worthy of remark that, when the eyes are closed, the same vacillation or loss of muscular control is the precursor of sleep.

*Cause of the Division of the Nervous or Thinking System.*

It is remarkable that, in the propagation of resemblance from parents to progeny, the thinking organs should be divided;—one parent giving one portion,

namely, those of sensation and observation,—and the other parent giving the other portion, namely, those of passion and volition,—while the intermediate middle part is also divided. Thus, to restate the law in another and briefer form, THE THINKING ORGANS ARE, IN EQUAL AND DISTINCT PORTIONS, DERIVED FROM BOTH PARENTS; WHILE ONE GIVES THE WHOLE OF THE NUTRITIVE, AND THE OTHER THE WHOLE OF THE LOCOMOTIVE ORGANS.

A little reflection explains the cause of this peculiar DIVISION OF THE THINKING SYSTEM, as well as this dependence of the nutritive and locomotive systems.

It is evident that, in all the *voluntary* acts of animals, the *thinking system* must take the lead, and that, in the act of reproduction, they are also functions of that system—passion and volition, which must excite the *locomotive system* to fulfil the purposes of the *nutritive system*. Hence, in reproduction, the apparent predominance of the thinking system.

It is also evident that, in all voluntary acts in which two sexes are engaged, two thinking systems are involved; and, as the first portion of the thinking system, sensation and observation, is passive or dependent on impression, and the last portion, passion and volition, active and exciting to locomotion, it is evident that, in the act of reproduction, one or other sex will always be relatively passive, and the other relatively active.—Hence the progeny will receive, from one parent, the organization on which, in the thinking system, sensation and observation depend, and from the other, that on which passion and volition depend; for the very term reproduction implies the communi

eration of similar organs and functions, and therefore of the most energetic and characteristic ones.

*Thus the communication of mind, and of its most distinguishing or peculiar characteristics to progeny, evidently depends on mind, and the relative predominance of its two great divisions in parents; and, on each of these again, depend the locomotive system and the vital, respectively.*

As to the connection of mental faculties with external forms, I may observe that, with the forms of the organs of sense and the forehead, appear to go the qualities which characterise not only the sense of sight, smell, taste, &c., but the observing, imitating, acquiring and other faculties; and that, with the backhead and cerebel, appear to go the passions, acts of the will, appetites, &c.

*Hypothesis as to the Increased Energy of that System.*

There is certainly some reason to suppose that whatever increases the ardour of passion invigorates the progeny.

It is a popular notion "that natural children," as they are called, have often more genius or ability than those who should, I suppose, be called artificial ones; and this is ascribed to the circumstance, that they are commonly produced by a more active as well as ardent love, and that the invention of their parents, being continually employed in concealing their passion from those who might condemn it, in deceiving jealousy, and in triumphing over obstacles, they naturally transmit to their progeny a portion of the talents to



which they thus owe their existence. It is, at the same time, probable, that their superiority must, in many instances, be attributed partly to the mental exertion that their want of support imposes upon them even from early years.

Such were the origin and education of several of the ancient heroes, said consequently to be the offspring of gods—Hercules, Theseus, Achilles, Romulus, and, in modern times, of Galileo, Erasmus, and a multitude of great men. For the same reason, younger brothers, being unprovided for, are more generally distinguished by ability.

*The Directions of its Functions Hereditary.*

Galen says, “Manners depend on temperaments;” and it is generally felt that habits and pursuits long followed in families, develope the organs which they employ.

It has even been observed, that the child of a civilized European will acquire knowledge more readily than the offspring of an American savage; while it is known that such offspring, though brought up from a very early age in the colleges of the United States, exhibit an almost irresistible desire to return to the forests, and recommence the wandering life. On the other hand, we are told that, in the voyage up the Missouri by Clarke and Lewis, one of the company was the son of an Indian woman, who had married a Frenchman, and that this half Indian acquired the power of tracing animals through the trackless wood to any extent,—which his companions could not acquire.

It is also known that the whelps of well-trained dogs are, almost at birth, more fitted for sporting purposes than others. The most extraordinary and curious observations of this kind have been made by Mr. Knight, who, in a paper read to the Royal Society at one of its last meetings, showed, that the communicated powers were not of a vague or general kind, but that any particular art or trick acquired by these animals, was readily practised by their progeny, without the slightest instruction.

It was impossible to hear that interesting paper read, without being deeply impressed by it. Accordingly, in taking a long walk afterwards, for the purpose of reflecting on the subject, it forcibly struck me, that the better education of women was of much greater importance to their progeny than is commonly imagined; and, in calling on Sir Anthony Carlisle, on my return, to speak of the paper and its suggestions, he mentioned to me a very striking corroboration of this conclusion.

He observed that, many years since, an old school-master had told him, that, in the course of his personal experience, he had observed a remarkable difference in the capacities of children for learning, which was connected with the education and aptitudes of their parents; that the children of people accustomed to arithmetic learned figures quicker than those of differently educated persons, while the children of classic scholars more easily learned Latin and Greek; and that, notwithstanding a few striking exceptions, the natural dulness of children born of uneducated parents was proverbial.

Writing afterwards to Mr. Knight as to what appeared to be the striking and important applicabilities of his paper, he, in his reply, (23, November,) and in a subsequent letter, (21, December,) favoured me with the following illustrative remarks:—

“I, seventy years ago, heard an old schoolmaster remark, in speaking of my late brother’s great facility of learning languages,\* that, ‘in fifty years’ experience, he had never seen a child of wholly illiterate parentage and ancestry (such being at that time very abundant,) who could learn languages;’ meaning, of course, Latin and Greek.

“Being with a friend, about thirty years ago, shooting grouse upon a Welsh mountain, we were joined by a native of the country, who exhibited, with the manners and character of a buffoon, very great powers of combining ideas, and who possessed a good deal of a kind of irregular and uninstructed wit. I pointed out to my friend the difference between him and the other peasants, and observed that, on inquiry he would prove to be the son of an educated male parent. It proved, upon inquiring, that he was a gentleman’s bastard.

“Being in my parish church, about ten years ago, a little girl, in repeating her catechism, got through her part in less than half the time that her companions did, and without missing, or hesitating about, a single word. She was wholly unknown to me; but

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\*The distinguished Mr. Payne Knight is here alluded to.

I whispered to Mrs. Knight, 'That girl is a gentleman's natural daughter ;' and so she proved to be.

"The following circumstance, which is at least very singular, leads me to suspect that the kind of language used by any people through many successive generations, might change and modify the organs of speech, though not to an extent cognizable by the anatomist. A celebrated French civil engineer, M. Polonceau, visited me some years ago, bringing with him a young French gentleman, who spoke English eloquently, and perfectly like an Englishman, though he had been in England only two years, and, as he assured me, knew nothing of the language previously, nor had ever heard it spoken. I asked him whether he could pronounce the English name Thistlethwaite, and he instantly pronounced it most distinctly and perfectly. The next day, when talking of other matters, he said that he had some Irish relations; and it appeared that his grandmother, on the female side, whom he had never seen, was an Irishwoman. Hence arose, I do not at all doubt, his power of so readily pronouncing the word I had prescribed. A French gentleman at Paris boasted to me that he could pronounce correctly any English word. I proposed Thistlethwaite to him, when, instead of trying, he exclaimed, 'Ah, barbare !' "—By the by, the *barbarism* is in the inability to pronounce the English *th*,—the *Greek*  $\theta$  !

"I believe," adds Mr. Knight, in a most interesting anecdote, "that most of the experiments in breeding, which have been accurately made and accurately reported, have been made either by Sir John Sebright or



by myself; and it is somewhat singular that we both descend from the same grandfather, his mother having been a daughter of my father's brother. We were, however, unacquainted in early life, and neither of us was influenced in any degree by the other in our pursuits.

"It is, I think, important that the minds of the ancestry should have been exercised in some way; and I think the hereditary powers will generally be found best calculated to do that which the parents, through successive generations, have done. The offspring of a family of American or Australian savages, would more readily acquire the power of tracing the steps of an animal in a trackless forest, than the child of an educated English family would do. The employment of weaving, where the threads are made to cross each other, so as to present the forms and colours of flowers, would, I conceive, prepare the mind of the offspring even for studying mathematics, &c."

Mr. Knight's observation (22, May) remarkably corroborates this first law, even as to the distribution of the mind of parents to progeny. He observes, that "when the male and female parent are of the same species and *same variety*, each parent has an *equal influence* upon the offspring as to temper, sagacity, &c., and in giving hereditary propensities.

*Explanation of the Differences in the Features of Children, who yet resemble the same Parent.*

It is obviously because these two fundamental distinctions of mind and sex thus depend upon totally



different causes, that they are found to be variously combined and intermixed in progeny.

Hence arise THE FOUR SIMPLEST COMBINATIONS OF CHARACTER in the children of one family :—the paternal organs of sensations and observation with the male sex,—the maternal organs of sensation and observation with the female sex,—the paternal organs of passion, volition, &c., with the male sex,—the maternal organs of passion, volition, &c., with the female sex:

When, moreover, it is considered how much of modification is caused by the combination of functions, as in the case of different sexes with similar features, it will easily be seen to what variety of aspect, in the same family, this must lead.

But it is necessary I should explain the causes of the more minute differences which we observe in the features of the children who present these general resemblances to the same parent.

For some previous vague remarks, then, I would substitute a more definite doctrine ; and that doctrine as to the details of resemblance is even essential to establish the sufficiency of this first law in its most minute applications.

A lady one day said to me, “ In my own children, I see an illustration of the general truth of your law : some of them resemble me in the forehead, osseous face, organs of sense, &c., and their father in back-head and figure ; but why do those who resemble me in face differ somewhat from each other in particular organs of sense and features ? ”

The question was rational and clever. A regard

for propriety prevented my giving an explicit answer : I could only say, "Observe that all these differences in features are mere modifications of your own,—such modifications as you yourself might assume under the influence of different emotions,—such modifications as you actually have assumed, and therefore have, in these very instances, communicated."

To explain this most important and interesting point more methodically and in detail.—The reader has seen that organization and function are communicated from parents to progeny ; he knows that each distinct organization must produce function equally distinct ; he knows that function always reacts on organization, as is shown by the improved forms which well-directed exercise produces on one hand, and by the deteriorations which labour causes on the other ; he has seen that the practice of performing certain acts in parents, gives a distinct tendency to the performance of these acts in progeny ; he knows, in short, that organization and function in the parent, are the real and only causes of organization and function in the child. Can he then doubt that the peculiar state of the organization, and the peculiar exercise of every function, at the moment of orgasm, must exert the *most* powerful, the *most* undivided influence over the organization and function of the delicate, susceptible and plastic *ens*, then and by these very acts, called into existence ?

The act then by which a new being is called into existence is far more momentous, even in its most minute details, than has yet been imagined. It has been, and it will further be seen that, when in one

parent, sensibility exceeds volition in a greater degree than in the other, that parent communicates the anterior series of organs—the organs of sense, the anterior part of the brain, and the vital system. On the contrary, when in one parent, volition exceeds sensibility in a greater degree than in the other, that parent communicates the posterior series of organs—the cerebellum and the muscular system.\*

Nor can the matter stop here: if the organization and function of the parent are the real and only causes of the organization and function of the child, then must they be so, not in generalities, (for these are mere acts of the mind,) but in the minutest details. The state and the act of each organ of sense in the parent conferring these, must stamp the character of each in the progeny—nay, their expression in the parent must more or less become their character in the progeny, for the influence is then that of a moment, it cannot be extended, and that which is temporary in one must become more or less permanent in the other. We can no longer wonder, then, that several children having the organs of sense either of the mother or of the father, should differ as to each of these and as to every feature, according to the general activity and

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\* But it may easily be that, in one parent, both sensation and volition shall exceed in intensity these functions in the other parent? Yes: but then one of these functions—either sensation or volition—will, more than the other, exceed the corresponding function of the other parent; that predominant function will consequently be given by the parent exercising it; in him, the subordinate function will accordingly be neutralised, for he cannot give a function and its opposite, and the feebler function will therefore remain to be given by the other parent.

the particular action of each at the moment of creative power.

The senses connected with intellect, the eye and the ear, or those connected chiefly with life, may be employed. In softened light, the delighted eye may gaze over beautiful contours and colours; or, these excluded, the ear may drink in the soft and sweet music of the voice; or, in darkness and silence, the touch may wander over forms.—But the reader must illustrate for himself the mode in which each sense may be exclusively called into action.

Can it be supposed, then, to matter little whether the new being be the product and the personification of intellectual, or of mere sensual pleasure! or whether that pleasure be one of gentle emotion, or of passion!

According, then, to the state and action of these organs in the parent, must each be feeble, moderate, or greatly developed, faintly outlined, delicate, or coarse, in the progeny. Ampler elements of modification and diversity even of the same organs cannot exist. And these observations apply to every organ, as well as to those of the senses.

Thus, I think, are explained all the diversities in the forms of progeny.

I must here remark, that while the parents give character and capability of expression, the events of life, pleasurable or painful impressions, and gentle or violent passions, greatly modify expression. In comparing the heads of progeny with parents, the latter is of subordinate consequence.

*Importance of this Law.*

Now, as on the size, form and proportion of the various organs, depend their functions, THE IMPORTANCE OF THE FIRST LAW, is immense, whether we regard intermarriages, and that immunity from mental or bodily disease which, when well directed, they may insure,—or the education of children in conformity with their faculties,—or the employment of men in society,—or advantageous breeding among domesticated animals.

To illustrate the importance of this law as regards *intermarriages among mankind*, and especially as regards insanity among the opulent classes, the causes of that disease which are perpetually operating, and those of mental debility, may first be noticed. I do this from a previous and little known work of my own.

Genius, which is whetted by adversity, soon becomes blunt, in the bosom of ease ; and mediocrity of talent, when so circumstanced, becomes absolute imbecility. Men entitled, by the mere accident of birth, to a monopoly of honours and indulgences, need make no effort to obtain them. Such trouble is unnecessary ; and not one in ten thousand bestows it. Intellectual power, therefore, is gradually lost, and the man is at last utterly debased.

All history, accordingly, shows that those princes, nobles, &c., who have gained the admiration of mankind, have almost always either been the first of their race who reached that rank of society, or have suffered from an adverse fortune, which elevated rank can-



not always prevent; and that, as uniformly, the children of these persons, who were born to honours, affluence and indulgence, have been far their inferiors in intellectual attainment.

As to ancient times, we know that some of the greatest men in Greece were of the obscurest origin, and that foreign female slaves gave birth to many of them. A Carian was the mother of Themistocles; a Scythian was that of Demosthenes: and a Thracian gave birth to Iphicrates and Timotheus! On the other hand, it is certain, that the children of Socrates and of Pericles were destined to stupidity and obscurity!

De Pauw has stated, that many observations respecting Spain and Portugal attest, that the noble families there are constantly the most stupid; and he observes that those of other countries would be added, if examined with equal attention. Indeed, we every day see, that the descendants of the most illustrious men present, in almost every instance, the most pitiable degeneracy of character.

The absence of freedom in intermarriages contributes greatly to enhance these causes of degeneracy; for if weak people intermarry, it can lead only to an accumulation and increase of weakness and worthlessness.

This cause affects even nations, when they cease to intermarry with their neighbours. Of this, the most remarkable examples are the castes of India, the Gipseys, and the Jews. The cause and the consequent degradation are alike common to all of these.

It has now been seen that where one parent communicates to a child the form of the face generally and the forehead, the other will be found to communicate the form of the posterior part of the head ; and, while the child has the observing faculties of the former, it will be found to have the reasoning faculties and the passions of the latter.

A moment's reflection will show, therefore, that the proportion which exists between these parts in the heads of parents, is nearly decisive of the character of their progeny ; and that, if these parts be feeble in both parents, they must also be so in the offspring. And hence the perpetually increasing degeneracy of aristocratic families, in whom none of the intellectual organs are improved and strengthened by incessant action, but, on the contrary, dwindle away, as do all bodily organs, by entire inactivity.

As to kings in particular, their intellectual faculties are so low, as always to border on fatuity.

That fatuity has, in all ages, been the disease of hereditary royalty and ancient dynasty, the most superficial observer must allow. This is a truth of such magnitude and importance, that, to the interests of political philosophy, its discussion is due, unfettered by all temporary and trivial considerations. If the fact be doubted by any of my readers, I may point out to them the cases of George III., Paul of Russia, the late sovereigns of Denmark and Portugal, the deposed King of Sweden, &c.—a fourth or fifth of the kings then occupying the thrones of Europe ! and consequently a proportion of mental disease far greater than can be exemplified in any rank of society.

I would not scoff at human misery, either mental or corporeal; nothing can possibly be more abhorrent to my feelings; I mention this subject in pity, not in scorn. But if, on consideration, it appear that there is any truth in the allegation—nay, if it be found that even mental imbecility, or merely a degree of intellectual feebleness, or indeed anything like a want of the fair proportion of mind seen in other ranks, is at all characteristic of that which some deem the highest rank in society—then do we owe the sober discussion of that question at once to the interests of that rank, and to those of philosophical inquiry.

It appears that nature has conferred no good on man unqualified by ill. It even appears, that the greatest good is generally chequered by the greatest ills, and that the highest rank in society, if good it can be called, is invested with the most appalling dangers. Even a moment's assumption of that rank seems to bring with it attendant evils. That light heads should be easily turned, is not wonderful; but that that of Bonaparte, for example's sake, which contained much more brain than that of any European king, and more intellectual power than all of them—that such a head should have been turned by the possession of power, is a striking illustration of the preceding remark.

When Napoleon's senators abandoned him and his fortunes, and in a memorable document complained of his despotism, he acknowledged it as candidly, as he ascribed it justly, to the spell of their incessant flatteries. Here, then, we approach the very cause

of that fatuity from which it is so difficult to separate kingly power : a state unnaturally elevated above all fellow men,—the anticipated supply of every want which that state commands,—the foretaste of every pleasure ere it is desired,—the consequent inutility of every mental effort,—the ennui which must ensue,—the pride, fastidiousness, and morbid irritability in which the mind is consequently plunged,—the influence of these upon attendants,—the scarcely evitable reaction of their minds in every supple and conciliating device, in every artful and debasing flattery,—the absence of all sincerity,—the absolute proscription of simple and manly truth,—the adoption of gaudy pageantry, which occupies the eye and ear, but touches not the heart or the mind,—the heartlessness, the coldness, the worthlessness of such a state. Such is the precise succession of those circumstances which, sooner or later, annihilate mind in hereditary royalty and ancient dynasty.

From this degradation of mind may escape the founder of a dynasty, who is agitated by plans of succession, or acts of usurpation, or schemes of conquest ; and so also may the prince on whom misfortune frowns ; but it is true, that in general the very next successor of such a prince is an imbecile, precisely because the achievements of his predecessors seem to have rendered it unnecessary for him to think.

In order satisfactorily to explain the corporeal and physiognomical changes that the circumstances in which they are placed produce in princes, we must observe, that the more any of the organs of the body are employed, the more they are developed in size.



Thus, with regard to the muscles or organs of acting, incessant use greatly enlarges the limbs of porters, the calves of dancing-masters, the arms of sailors, the wrists of postilions, all the muscles of one side in fencers, &c. ; and long continued inaction causes them to become feeble, and to dwindle away. Just so with regard to the brain, or organ of thinking—incessant use causes its expansion ; and inaction either retards its growth, or produces its diminution ; and, in the latter case, though the whole head may not seem to grow less, the skull becomes thicker : hence perhaps the circumstance, that the skulls of fatuitous persons, who die in the hospitals, are often found to be remarkably thick.

Now, as it appears, that the very necessity of thinking is abridged in princes, by the circumstances in which they are placed, and as, generally speaking, in proportion to these circumstances, the brain is unemployed,—its slight developement, or its actual diminution in such persons, is explained by the preceding statement. When we add to this the consideration, not only that all organization, whether improved or degenerated, is communicated to children, but that, in this case, the degraded organization is every hour still further degraded by the operation of the same circumstances on the child which operated on the father, we cannot wonder at the peculiar characteristics of the kingly countenance, namely, a low and retreating forehead, and expanded organs of sense,—a diminution of the organs of thinking, and an increase of the organs of mere sensual enjoyment. Accordingly, I find, that the older the dynasty, and the more legitimate the race, if the head be viewed in profile, the more



does the forehead retreat from the root of the nose, and the more do the nose and the other parts of the face advance from the same point. See the faces of all the branches of the Bourbons. Their countenances generally are truly royal.

Professor Camper has shown, that among inferior animals, the face advances and the forehead retreats, as the species diminishes in intellect. From this law there are some exceptions, which are, however, very easily accounted for; but, generally considered, it is equally true and important. Thus, the forehead of the monkey is more depressed than that of the negro; that of the dog, more depressed than that of the monkey; that of the horse, more depressed than that of the dog; that of the bird, more depressed than that of the horse; and that of the fish, more depressed than that of the bird. The reason of all this is, that the brain or organ of thinking diminishes, and the organs of sense proportionally increase, as we descend among animals. So well were the Greeks aware of the importance of this law—of the brain diminishing with the diminution of intellectual power, that, in their immortal sculptures, they have given even an unnatural expansion to the head, and especially to the forehead, in order to confer the most august character on their heroes, demi-gods and gods.

Now, to this practice, it is probable that the Greeks were led, both by that exquisite taste which has distinguished them from all other nations, and by a practical observation of the heads of the hereditary, and consequently intellectually degraded, Asiatic despots, whom they foiled in all their attempts at invasion.

To this doctrine, Camper was led by the strictest philosophical induction. Thus philosophy, observation and taste, at once support the doctrine I have inculcated, as to the intellectual and physiognomical character of princes.—If, however, the reader prefer demonstration to proof, he has only for a moment to consider the conduct, and to glance at the portraits, of the most ancient dynasties in Europe.

We have hitherto considered only the effect of circumstances on the intellectual and physiognomical character of princes. Let us now consider that of intermarriage. The principle of improving the breed of animals by crossing, is now fully appreciated. This principle applies to man as well as to inferior animals; and, carried still further, it explains the reason of the horror which all men, except princes, feel at the intermarriage of near relations.

But what has been the practice of all princely families on this subject? They have generally intermarried only with persons of similar rank—or similarly depraved education—of similarly degenerated intellectual and physiognomical character. Moreover, as these families have already often intermarried, their further intermarriages can introduce few new qualities—can propagate only the old and degraded ones, which are common to the whole.

The preceding observations are applicable not only to princes, but in some measure also to those other ranks in society, which, participating with them in ease and absence of the necessity for thought, participate also in the danger with which such rank and condition are always surrounded. In them, also, the

organ of thought being less employed, its volume gradually diminishes, and the muscles of the face being less frequently agitated by any energy of mind, it assumes a calm and cold placidity, a feminine softness and smoothness. Such persons lose the intellectual vigour which characterizes men, and which is more remarkable in northern than in southern nations, and acquire sometimes that sensibility, delicacy and taste, which characterize women, and which are more generally remarkable in southern than in northern nations. In short, men degenerate under the same circumstances which are favourable to female beauty; just as women become masculine and coarse, under the circumstances which are essential to the generation and excitement of intellectual power and energy in the male.

The preceding observations are also in some degree applicable to nations at certain periods, as well as to the highest ranks of society.—When a state has reached a certain degree of civilization, and its people, concentrating themselves in vast towns and cities, have attained the utmost limits of opulence and luxury, the public mind becomes proportionally stagnant from the absence of excitement,—artful subtlety is substituted for more masculine energy, delicate flattery for nobler sincerity, obliging falsehood for godlike truth; and these feeble and degrading habits are dignified with the name of politeness! Speedily, indolence, incapacity and insincerity, become the test of rank; and manly vigour, intellectual power and generous candour, become the marks of vulgarity. Nay, while even an erect, firm, or rapid walk, is thought to indi-

cate the plebeian, a feeble and unmanly gait, or rather a vermin-like crawl, is deemed the sure indication of the man of fashion; and while a distinct and articulate voice is thought the proof of low birth and degraded manners, a brutal drawl—an inarticulate, offensive and disgusting voice (which seems rather to issue from what physicians call the *primæ viæ*, than from a mouth) is deemed the sure criterion of illustrious origin and high accomplishment. These last are but the exterior signs of weakness and worthlessness; but they are not unimportant.

The result of all this is, that when nations are thus degraded, they are the more readily enslaved by their neighbours; when the higher ranks are thus degenerate, the more active vulgar take their places in society; and when princes are thus incapable, their monarchies are subverted.

It is evidently by attending to this first law—the law of selection, or the law of crossing, which has next to be described, that these fatal consequences to individuals, to families and to nations, can alone be avoided.

A knowledge of this law would, moreover, prevent intermarriage between two individuals, themselves perfectly sane, but who would probably produce insane progeny.—Thus, though, in one parent, the forehead and the observing, imitating and other faculties were very defective, and though, in the other parent, the backhead and the exciting faculties, the passions and the will, were equally defective; yet the former, owing to the developement of the middle and posterior part of the brain, and the latter, owing to the developement



ment of its middle and anterior part, might still be sane, or even possessed of superior abilities.—But if this law be admitted, true as it assuredly is, it follows that each parent may communicate either the anterior or the posterior organs; that, in this case, the offspring may receive the very defective forehead and observing faculties of one parent, and the very defective backhead and motive faculties of the other; and that the idiocy of such offspring would be the inevitable result. Living proofs of this fact are found wherever there are idiotic or weak-minded children.

In this case, indeed, the chances of sanity and insanity are equal, because the well-developed anterior part of the head in one parent, and the well-developed posterior part of the head in the other, are as likely to be propagated together, as are the ill-developed backhead of the former, and the ill-developed forehead of the latter.—But the case may be either worse, or better, than this; for if in one parent, there be but one of the portions of the head well developed, and in the other, neither portion, then there is but one chance of sanity against three of insanity or defect; and if, on the contrary, in one parent, there be both portions of the head well developed, and in the other one portion, then there are three chances of sanity against one of defect.—The general mode of correcting defects of the thinking system, by means of intermarriage, is thus rendered evident.

That of correcting defects of the locomotive system, or of the nutritive system, is similar.—Thus, the shorter body, longer limbs, and meagre frame of some of our own northern races may, in progeny, be cor-



rected by intermarriage with the longer bodied, shorter-limbed, and more fully formed races of our south-eastern counties. And, vice versâ, excess in these latter forms may, in progeny, be corrected by intermarriage with the former.

As organization is thus propagated in halves—the whole of the anterior series of organs (sensitive and vital) always going together, and the whole of the posterior series (voluntary and locomotive) similarly going together—the reader will see the error of the common hypothesis of blood. According to that hypothesis, the sire and dam equally impart blood to the progeny: the filly consequently produced by an Arabian horse and a cart-mare has one-half Arabian blood; the filly produced by the first one and an Arabian has three-fourths Arabian blood; the filly produced by the second one and an Arabian has seven-eighths Arabian blood; and the filly produced by the third one and an Arabian has fifteen-sixteenths Arabian blood!

Blood is certainly very easily divided; and it serves the purpose of this hypothesis very well. But why is blood the material pitched upon? Chyle or urine would have served the purpose just as well; and it would express just as much to say, the filly or the colt is three-fourths chyle or three-fourths urine, as three-fourths blood: all these are liquids contained in the tubular organs of the vital system, and go in mass along with that system wherever it goes—they are merely its perpetually varying contents. The fact is, that blood is a groom's term, invented by ignorant fellows who wanted to look knowing; and, from these





high authorities, it has been borrowed, to the end of obscuring the whole history and truth of breeding.

But I shall be told, "We do not mean real blood; blood does not mean blood here; it must not be taken in its literal sense" [the common subterfuge in everything of men who have no precise ideas, who do not know what they mean, but who would fain make others think they really mean something, and that worth knowing!] "we mean a kind of a general influence, which is divisible exactly like blood, and which the term blood is very well calculated to express."—Ask them if the thing they mean has not a name of its own, because wrong names excite wrong ideas; or tell them that, if they cannot remember the name, they perhaps can describe the thing; and they reply by saying, nothing or nonsense. It is, indeed, a mere name, an abstract term, that serves their purpose best.

To the reader, however, the folly of this hypothesis is evident, since he has seen that, not the inorganic contents of the vital organs, nor any fraction of these, but the whole vital system is at once communicated by one parent, and the whole locomotive system by the other.

This shows the absurdity of repeated crossings with the Arab horse or any other animal; for the only effect which even the first of these repetitions can possibly produce is, by a new half of organization, to supersede either the half given by the original stock, or that given by the first Arab, while the second repetition may supersede what was given by the remaining parent—thus destroying all that was given by both the original parents; and every two additional ones



may similarly supersede the organization of all those who preceded them. So that all that is gained by this, is a perpetual exchange and fluctuation, and consequently deterioration as likely as improvement.

## II. LAW OF CROSSING,

WHERE EACH PARENT IS OF A DIFFERENT VARIETY.

By cross-breeding, says Mr. Knight (21, December,) "that is, by breeding from a male and female of a different family, though of a variety of the same family, the Hereford breed of cattle for example, we always seek, in the male and in the family of the male, something which is defective in the female, or in the family of the female : but where both male and female are free from defect, or even where no tendency to a defect is seen, I think, and I believe others generally agree with me, that vigour is given to the offspring to a greater extent than when both parents are nearly related."—Here a somewhat extended sense is given to crossing; so that it seems to trench on what Sir John Sebright terms selection.

The second law, namely that of Crossing, operates where *each parent* is of a *different breed*, and when, supposing both to be of equal age and vigour, the *male* gives the *backhead and locomotive organs*, and the *female* the *face and nutritive organs*.

The facts which suggested to me this law, were those which I shall forthwith quote, as observed by Mr. Cline, Mr. Knight and Sir Anthony Carlisle.

The cause that, in crosses, the male gives the cerebel and locomotive system, is both striking and beautiful.—If no being can desire that of which it is



already in possession—if, on the contrary, it must desire most that which differs most (if not incompatible,) it cannot be wondered, that in crosses, where the desired difference is greatest, the male, in whom desire is most ardent, should stamp the systems by which he exercises desire, the voluntary and locomotive, upon the progeny.

Mr. Theobald of Stockwell, an extensive breeder, informs me that he has always thought that strong volition and great ardour on the part of the male stamps his form\* on progeny, a direct and singular corroboration of the cause just assigned.

It derives support also from the observation of Dr. Pritchard, that “*Mixed breeds* are very often produced superior in almost all their physical qualities to the parent races, and particularly with so much *vigour of propagation*, that they often gain ground upon the older varieties, and gradually supersede them. This one property of greater fecundity is often the particular reason for the selection, and the circumstance which induces agriculturists and the breeders of cattle to adopt new races in preference to the old ones.”

So much for the cause of the law.—The facts proving it are abundant.

One of the most remarkable crossess among the human species, is that between the European and the African negro; its effects being easily seen in consequence of the striking characteristics of the two varieties.

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*General form depending, as already explained, chiefly on the skeleton, which is the basis of the locomotive system.*

If, in this cross, the European is the male parent, he communicates the backhead and the general figure : neither the bones of the thighs nor those of the legs are bent as in the negro, nor are the heels long, nor the calfs high ; while the under lip and the point of the nose are considerably less, and quite European in character. The African mother, on the contrary, is seen in the narrow and retreating forehead, the high cheek-bones, the large eyes, the long upper lip, and all the remaining parts of the face. This is well seen in Plate VII, figures 1 and 2.

Another remarkable cross is that between the African negro and the native American.

In this cross, the African is generally the male parent ; and he communicates the backhead and general figure. The bones of the legs and those of the thighs are bent, the heels are long, and the calfs high ; while the lips and the point of the nose are similarly of African character. The Indian mother, on the contrary, is seen especially in the face being broader without any hollow under the cheek-bones, and in the face being flatter, without any projection of the teeth and jaws containing them. The flatness of these, and the prominence of the lips laid upon them, mark the curious combination of the African and the Indian. This is well seen in Plate VII, figures 3 and 4.

Thus, in human crosses, the male gives the locomotive system ; the female, the vital one.

Alluding to less remarkable crosses than these, Mr. Knight says, (21, December) " In the human subject, cross-breeding would, I do not doubt, be productive of good effect, if made between individuals and families

which had, through generations, been engaged in occupations of wholly different kinds.

Of the power of the horse to communicate, in a cross, his skeleton, and therefore his locomotive system generally, or in other words his general shape and character, Mr. Knight gives an interesting example (16, April, &c.)

“I have obtained offspring,” he says, “from Norwegian pony mares and the London dray-horse, of which the legs are preternaturally short, and the *shoulders* and *body* preternaturally *deep*, and the *animal* of course preternaturally *strong*. I felt my way cautiously in making such experiments, fearing that I might subject the unfortunate females to a very painful death; but I found the size of the foetus to be governed by the size and breed of the female parent.—I repeated the opposite experiment with opposite results.

“Where the size of the breeds differs much, the influence of the male parent and that of the female one upon the form of the offspring (particularly of those animals, of which nature intended the offspring to accompany the parent in flight at an early age) differ very widely; the female parent in such cases governing the *length* of the legs almost wholly; at the birth, I think wholly; but when the male belongs to a family of much larger size, the *joints* and *hoofs* are *larger*, and therefore occupy more space.”

And again, “The offspring of my Norwegian mares, as always happens in similar cases, had legs as short as their mother’s at birth; but the *male parent*, the dray-horse, caused these *legs* to grow *greatly stronger*, and

their *joints* and *bodies*, generally *much larger*, although the legs remained short."

Thus, in equine crosses, the male gives the locomotive system, the female the vital one.

As to mules, Mr. Knight (22, May) says, "The fact that, in mule quadrupeds, the male parent over-rules the female in giving form to the offspring, is placed beyond the reach of controversy ; and I feel confident that the opinion I give in the paper above mentioned, [upon the hereditary instinctive propensities of animals,] that the male over-rules to the same extent, or greater extent, in giving the disposition, and mind of the offspring, is equally well founded."

From Mr. Knight's expression, "the male over-rules, to the *same extent*, or *greater extent*," it is evident that he does not entirely over-rule. I was therefore desirous of seeing what organs, in such crosses, remained less affected by the male parent. At Carshalton, I found a team of three mules, the property of Mr. Whatney. They were evidently ass-mules, or mules of which the ass is the male parent ; having low fore-quarters, pointed hind-quarters, long docks, high narrow hooves, and a sort of squeal, instead of bray or neigh. All were remarkable for obstinacy, incapacity of backing, dislike to drink from a trough, liking for straw and coarse food, and propensity to roll. Two of these were Barbary mules, and had shorter ears, more open eyes, and more the head of the horse. One was a Spanish mule, and had longer ears, less open eyes, and less the head of the horse, as well as a more ass-like body. All had more vivacity, sensibility and quickness of motion than the ass ; and all were

females. But, though these animals had the general form of the ass, their organs of sense (and probably also their vital system) showed several characters of the horse.

I found also that Messrs. Reynolds and Lee, at Gar-rat Mills, had a fine specimen of the horse-mule, with the general form of the horse, as striking as Mr. Whitney's had of the ass—shoulders I think higher, fine equine neck, head also equine, eyes and nostrils rather open, and hooves shorter than those of the ass-mule and convex anteriorly (the posterior ones especially.) So also as to mind: his action was like that of the horse; he would back, drink from a trough, was an excellent hunter, &c. Thus the general form of the horse-mule resembles the horse; but his organs of sense (and probably also his vital system) show several characters of the ass.

As to kine, Mr. Cline, speaking of crosses, says, "The characters of both parents are observed in their offspring; *but that of the male more frequently predominates*. This may be illustrated in the breeding of horned animals; among which there are many varieties of sheep, and some of cattle that are hornless.

"If a *hornless ram* be put to horned ewes, almost *all the lambs will be hornless*, partaking of the *character* of the *male* more than of the female parent. . . In some counties, as Norfolk, Wiltshire, and Dorsetshire, most of the sheep have horns. In Norfolk, the horns may be got rid of, by crossing with Ryeland rams; which would also improve the form of the chest, and the quality of the wool. In Wiltshire and Dorset-



shire, the same improvement might be made, by crossing the sheep with South Down rams.

“An offspring without horns might be obtained from the Devonshire cattle, by crossing with hornless bulls of the Galloway breed ; which would also improve the form of the chest—in which the Devonshire cattle are often deficient.”

My Correspondent \* \* \*, in a letter of the 11, January, in answer to the question, “In crosses, where the male and female parents are of different breeds, does it not appear that the male, if young and vigorous, always gives that system, general shape and character?”—says, “I have not much actual experience as to crossing different breeds. Mr. Charles Colling put a *short-horned bull* to a [hornless] Galloway cow : the cross was successful, and exists at present in *most of the improved short-horned cattle*. I never heard of any of the produce being without horns, and I never saw one who could be distinguished from a pure short-horned beast. Mr. Vansittart used a well-bred *short-horned bull* to well-bred Hereford cows : the produce had all the appearance of *short-horned cattle*. I used a well-bred *Hereford bull* to common short-horned cows : *all the produce* had the appearance of *Herefords*. I remember Sir Charles Knightley having a very good hunter got by a *thorough-bred stallion* out of a *cart-mare* : he had the appearance of a cart-horse, but *the powers and speed of a well-bred horse*, excepting that he could not go fast up hill. I have a *mare* got by a *thorough-bred horse* out of a *cart-mare* : she takes very much *after her sire*. My opinion is, that where two animals are put together, in the breeding of one

of which pains have been taken for some successive generations to produce any given shape or quality, and in the breeding of the other of which no such pains have been taken, the produce will follow the characteristics of the former, whether it be male or female ; that is, to use the common farming language, a well-bred animal will mark his or her produce more than an ill-bred one." The reason is obvious—in the best bred animal, the voluntary and locomotive powers will always be most intense.

Thus, in crosses of cattle as well as of horses, the male, except where feebler, or of inferior voluntary and locomotive power, gives the locomotive system ; the female, the vital one.

As to dogs, the breeders state that, in a cross between the bull-dog and terrier, if the bull-dog is the father, the progeny have the shape (which implies the skeleton, and therefore the locomotive system in general) of the bull-dog ; and if the terrier is the father, they have the shape of the terrier.

Mr. Helps, of the Bayswater-road, an experienced breeder, informs me that even when the dog is merely as young and vigorous as the bitch, this is the case ; that it is more conspicuously so the younger and more vigorous the dog ; but that if the dog be old and enfeebled, and the bitch young and vigorous the reverse takes place ; and that this is true of all crosses of dogs. He adds that, under the same circumstances, the male sex predominates ; or the female.

G. Lee, Esq. Garrat Mills, had lately a cross between a terrier dog and a greyhound bitch, all of

which presented the shape of the father in a remarkable manner.

Thus, in crosses of dogs, the male gives the locomotive system ; the female, the vital one.

Respecting birds, the breeders state, that, in a cross between the male goldfinch and female canary, the shape and the skeleton of the mule produced is always that of the male.

Mr. Blake, John-street, says that, in every cross he has observed among birds, the male gives the beak, head, and all the bony parts that can be distinguished.

Mr. Nash, of Windmill-street, a breeder of the greatest intelligence as well as experience, also states that, in crosses, as in that between the male goldfinch and female canary, the male not only gives the beak and scull to the mule, as observed by Mr. Blake, but, in this instance, the longer neck, the wider chest, the longer sternum and the longer legs ; and that, in this case, some of these (the sternum especially) are longer than in the male bird. The cause of this evidently is, that in a mule all growth contributes only to individual life ; and, as to the sternum, we know that it is always shortest in the female, to facilitate the producing and laying of eggs ; and it is evidently longer in mules, because they are incapable of the due performance of any reproductive process.

For the same reason, "the ox of the Hereford breed," as Mr. Knight observes, "is much larger than the size of the cow would promise."

The translator of Bechstein says, "A bullfinch and female canary once produced five young ones, which died on a journey, which they could not bear. Their

*large beak*, and the blackish down with which they were covered, showed that they were *more like their father* than their mother."

"A male goldfinch," says Bechstein, "is paired with one or two female canaries, which succeeds better than by placing a male canary with a female goldfinch; the former being more amorous.

"Mules between the canary and the siskin.—If the mother be a green canary, the males will resemble [in colour] a female siskin; but, if she is white or yellow, their colours are lighter, yet without differing greatly from those of *the siskin, which they always resemble in shape*.

"Mules between a canary and a green bird, or a citril finch.—If the hen canary is neither white nor yellow, the mules differ little from the common grey or green canary, except in being more slender, and having *the beak shorter and thicker*."

Mr. Knight (4, December) says, "I was engaged in an attempt (which failed, though a similar experiment had been in one case successful) to obtain offspring from the peacock and Turkey hen, when the wife of a cottager informed me, that a farmer resident within a few miles of me, had a bird bred between the common hen and a wood-pigeon. Upon further inquiry, I found that a chicken, which had been deserted by its mother, and a young wood-pigeon, had been reared together, the wood-pigeon constantly paying his addresses as to one of his own species. Many eggs were laid by the hen, but one only hatched; and this afforded the bird in question. It was a hen in every respect, except that the base of *its beak* was quite



naked, soft and turgid, *like that of a wood-pigeon*, that the feathers rose upright from the base of the beak, and that *the head of the bird strongly presented the character of a wood-pigeon*. I attributed this peculiar form, &c. to mere accident; but I am now disposed to doubt."

He also says (23, November,) "I thought that I saw a prevalence of the *male parent* in the *disposition and habits* of the *mule birds* bred between the common and musk duck."

Thus, in crosses of birds, the male gives the locomotive system; the female, the vital.

As to fish, Sir Anthony Carlisle's statement shows, that, in the mule between the male trout and female salmon, the size (and therefore the skeleton) is given by the male, as appears from the following letter.

" Langham Place, Nov. 20, 1837.

"My dear Sir,

"More than thirty years since, the breeding of trout was tried by impregnating their ova in confined water-cages made to protect the young against their natural enemies.

"As I had some share in these experiments, I undertook to try to breed those mule fishes, known to be a produce between male trouts and salmon roe, or the reverse. I accordingly procured a quart jug full of ripe salmon roe from the freshest fish just arrived at Billingsgate, in the month of January; and I proceeded with them directly to Carshalton, where they were carefully deposited by a man who waded into the stream, and raked the gravel in the trout spawning gravel heaps.



"In the month of April, a new sort of fish appeared, for the first time, in that river, which proved to be the mules, called skeggers, in the Thames, smelts, in the north of England rivers, and gravel-last-springs, in many of the western and southern counties. They were, in this case, very abundant; and apparently their numbers corresponded with the salmon spawn deposited in the trout gravel hills.

"These mules never appear but where salmon invade the breeding gravel-hills of trout; and, in my experiment, the impregnators were necessarily male trouts, because salmon never pass the mills upon the Wandle. The influence of the male trout in this instance was therefore unquestionable.

"*These mules partook of the character of trout more than of salmon.* They had bright red spots on their sides; but the black colour was shaded downward in bars, like those of the perch. *The tails were not forked like those of the salmon,* as I have seen them in the Thames skeggers, (from which I infer the male salmon, in that case, to have been the impregnators.) They grew to *the length of the male parent* [therefore had a similar skeleton,] and to the weight of a quarter of a pound, and they disappeared before autumn.

"I am, my dear sir, yours,

"ANTHONY CARLISLE.\*

"To Alexander Walker, Esq."

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\* "The natural history of the mule between the male trout and the salmon," says Mr. Knight, "is, I suspect, very little known, after the first nine months of that animal's life. Instead of going off to the sea with the first spring floods, they remain till autumn, when they go off, and nothing more is, I believe, known respecting them. They are almost wholly males."

This giving of the osseous system, skeleton, horns, &c. in all these cases, shows that the whole locomotive system (for the ligaments and muscles go with the bones) is given, in crosses, by the male; and, from the general law, it follows, that the vital and nutritive system is given by the female.

There is now a great hypothetical or theoretical point in which I would presume to dissent from Mr. Knight, Sir John Sebright and \* \* \*: it regards the distinction made as to *permanent hereditary character and habits* (that is, character and habits unvarying as communicated to progeny,) and such as are not so.

"In giving such changes of form," says Mr. Knight (21, December,) "the influence of the male and female parents have been, as far as I have observed (and I have paid a good deal of attention to that point,) equal, *provided the habits of each in their ancestry had been equally unvarying.*"

Now, I believe that there is no more want of adherence of the two series of organs, vital and locomotive, in any one case than in another—or in other words, that all combinations are equally variable, or equally permanent. The whole difference is, that, in keeping to the same variety, we combine series so similar, that they seem to be the same, and then we call them permanent; whereas, in crossing, we at first generally combine series so unlike that every difference is apparent, and we afterwards use their progeny promiscuously and indiscriminatingly.

The new animal will then seem less permanent, only because, in a union between animals constructed of two very different series of organs, these organs,

after dividing in their immediate progeny, will recombine in the produce of these, and re-form the precise combinations of the parents who were crossed.— But this re-formation may also be prevented, as shall be shown in the sequel.

First, however, it is necessary to see the whole strength of the argument on the other side, enforced by examples, of which there is an abundance.

“If I were to breed,” says Mr. Knight (29, December) “from a female of this kind with a male of similar origin [cross-breeds from a Hereford bull and Alderney cow,] neither of them of course possessing permanent hereditary character, the offspring would be extremely dissimilar to each other; some would appear nearly pure Herefords, and some nearly pure Alderneys; and if such mixed breed were to become the stock of a farm, some apparently perfect Herefords, and some perfect Alderneys, however begotten, would be produced during a long succeeding period.

“Although,” says Sir John Sebright, “I believe the occasional intermixture of different families to be necessary, I do not, by any means, approve of mixing two distinct breeds, with the view of uniting the valuable properties of both: this experiment has been frequently tried by others, as well as myself, but has, I believe, never succeeded. The first cross frequently produces a tolerable animal, but it is a breed that cannot be continued.

“If it were possible, by a cross between the new Leicestershire and Merino breeds of sheep, to produce an animal uniting the excellencies of both, that is, the carcass of the one with the fleece of the other,

even such an animal, so produced, would be of little value to the breeder; a race of the same description could not be perpetuated; and no dependence could be placed upon the produce of such animals; they would be mongrels, some like the new Leicester, some like the Merino, and most of them with the faults of both."

Having put to my correspondent \* \* \* the following question, "What reason is there to suppose that a cross between the new Leicesters and the Merinos could not be perpetuated, that is, a cross combining their best qualities?" I received the following answer (11, January:) "It is not impossible that such a cross might be established; but I think the probable result of the attempt would be, that the tendency to fatten and to become fit for the butcher at an early age, which the Leicesters now possess, would be lost, while the fineness and beauty of the Merino wool would be much worsened. A man may take one cross without much permanent mischief; but if he attempts to produce a cross breed, it usually happens that the progeny possess the faults of both the parent breeds, instead of their merits. Besides this, he cannot look forward, with anything like certainty, to what any young animal will be: some would be like Merinos; some like Leicesters; and I should think almost a century must elapse before the most skilful management could produce animals having the characteristics of well-breed sheep."

Now, while the cross between the Hereford and Alderney is a reasonable one, that between the Leicester and Merino is not so, because the carcass and the

wool go together with the locomotive system, and whichever animal should give one, would in reality give both. I had myself wrongly imagined that the wool depended on the vital system, when I put the preceding question to my correspondent \* \* \* ; and even now I retain that statement of the case, because, *supposing* the carcass to depend on the locomotive system and the wool on the vital system, it illustrates the object in view, as well as the real and practicable case of the Hereford and the Alderney. In fact, such difficulties admit of the most satisfactory explanation, as well as of the easiest rectification, according to the laws already announced.

First, as to explanation.

A and B, who are more or less perfectly crossed, may have very different vital and locomotive systems : of their immediate progeny, C may have the vital system of A and the locomotive system of B ; and D may, on the contrary, have the locomotive system of A and the vital system of B (for in a feeble or imperfect cross, such variation may occur :) and, of the progeny of these last, E may have from C the vital system of A, and from D the locomotive system of A ; and F may have from C the locomotive system of B, and from D the vital system of B. Thus A and B may be re-formed in the third generation.—In all this, the differences will be evident ; the results of the cross will appear to be variable ; and want of permanence will be imputed to it.\*

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\* If the vital and locomotive systems of A and B had not been very different, but very similar, this change, however real, would not have been apparent, and permanence would have been ascribed to the breed.



This is an illustration of the very cases spoken of as occurring in the preceding paragraphs. They would arise from this, that the locomotive system of the Hereford bull existing in one, would be as often added to the vital system of the Hereford existing in another, as these organs of the Alderney cow would be united—so that both would be re-formed.

On this explanation, \* \* \* (23, February, 1838) says, "If your theory was correct, it would be a reasonable mode of accounting for the difficulty of preserving a cross breed."

Secondly, as to rectification.

The first good result of crossing may certainly be maintained, by taking care that the crosses are strong and perfect, and that the male parents, having the locomotive system required, shall also dominate by youth, vigour, &c. By this means, male and female progeny may be procured, each having not only the precise locomotive system, but the precise vital one required; and these can produce none but progeny of the character desired.

Or if, under the less favourable circumstances of feeble or imperfect crosses, few should have the locomotive and vital system required, and others the reverse, these last ought not to be employed, but others still obtained having these systems similar to the first; for these also could produce none but progeny of the character desired.

It is, therefore, from not understanding the distinct propagation of the two series of organs, and the mode of preventing their re-combination which the law of crossing affords, that the unsuitable produce of any

cross is bred from. Assuredly, if when two or more of the cross breeds are obtained, each having similar locomotive and vital systems, and these systems, precisely such as are required, these alone can be propagated by them—they cannot give what they do not possess—the faulty parts, being cast out of this combination, they cannot, *by its means*, be reproduced in any repetition of it.\*

But it is remarkable, that Sir John Sebright's language implies the truth of the doctrine I have now delivered, without his being aware of it.—He says as above quoted, "The first cross frequently produces a tolerable animal, but it is a breed that cannot be continued."

So also Mr. Knight (21, February, 1838) says, "Cross-bred animals of the first generation are *generally* good, provided the breed of the male be not of smaller size than that of the female; but not otherwise according to my experience."

Now, seeing that the operations of nature are simple and never capricious, why does it *frequently*, or *generally*, produce a tolerable animal!—Because, if the cross is a feeble or imperfect one, the male, dependent only on relative energy, may give either locomotive or vital system, and not the precise one desired; and so may the female. In one case, therefore, the cross will be a tolerable one; and, in another, it will be an intolerable one. But the breeder having no notion that these two systems never go together from

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\* If this is not correct, what becomes of the old axiom "like produces like?" for here would be *like* producing *unlike* in an extraordinary degree.

one parent, and having no idea of the entire difference which subsists between them, is incapable of distinguishing them.

And why is it a breed that cannot be continued?—Because, precisely as I have described above, the breeder next puts together two products of the first cross, without this due distinction; and the consequence is that, precisely also as I have above described, he re-forms both the original breeds.

But the fact is, that able breeders have, either by accident, or by keener observation, often accomplished all that they desired in this way.

Mr. Wilkinson says, “I shall inquire, whether a cross from two distinct breeds can be obtained and continued, so as to unite, in almost an equal proportion, the properties of both; and I am fully of opinion that this can be accomplished . . . I have seen the latter effected between the long and short-horned cattle.”

It certainly seems surprising that breeders, having, in any case, seen a cross perfectly successful and eminently beneficial, should not have been led to inquire more closely and carefully into the circumstances under which it occurred. As similar causes always produce similar effects; so similar conditions in crossing will always produce similar progeny, whether one cross or ten crosses be made.

Mr. Knight (29, December) observes, that “The offspring of the cross-bred animal, if a thorough bred Hereford bull were the parent, would scarcely be distinguished from a true Hereford, on account of the male having, and the cross-bred female not having,

*permanent habits*. But the law again explains this; for the cross-bred must already have half the Hereford organization, and the Hereford bull again employed may give the other half.

“Such occurrences,” adds Mr. Knight, “continually present themselves in the human species, in this, and in every country which is inhabited by a race which has been long ago civilized; and these circumstances lead me to doubt the justice of some of your inferences . . . Amongst a people so extensively cross-bred, between different families, as the English are, it is not practicable to make experiments similar to those above mentioned.”

All that I have said, however, is equally applicable to the races of mankind.—In Britain, the pure races may yet be seen—Saxon in Norfolk, Suffolk, Essex, &c.; Celtic in the western highlands; Danish, with red hair and the *burr*, in the north of England; Norwegian further north; Slavonic, with cat-like faces, in Caithness; &c.—Organization is indistructible, and can be cast out or omitted only by the means above described, that is, by excluding what is faulty on both sides in the second generation. But as, among mankind, this casting out or omission cannot be accomplished generally (but only by the few who have the knowledge and the means to improve their families,) the original combinations are perpetually reproduced, and the character of the original colonists or invaders, is every where to be seen, as in the counties now mentioned.

In regard to the importance of this law as regards the *crossing of the breeds of animals*, the slightest con-



sideration will show that, if, of the two great series of organs described, each belongs entirely to a distinct parent, we consequently can neither derive, in progeny, both series from one parent, nor portions of both from each parent, but that every attempt to do so must be a failure, and must consequently lead to mere loss of time and money.—It, at the same time, indicates the rational mode of procedure.—It moreover shows that, in a feeble or imperfect cross, bad as well as good combinations may be produced; but that such progeny as present the precise qualities desired, must alone be employed in further breeding, while inferior progeny is cast aside.

Here, it will be observed, that while great difference was sought for in the cross, similarity is sought for in the pair it produces, for, without that, there could be no homogeneity or conformity of breed—it would seem (to use Mr. Knight's language) to want permanence; nor can any cross ever be established without this similarity being obtained in its produce.

This similarity has nothing to do with that *quasi* identity which is the principle of close and strict in-and-in breeding. Moreover, it is soon diversified by the modifications and accidents arising in an enlarging herd or flock, and permitting, according to the first law, the practice of that selection which *maintains* the cross, without degenerating into in-and-in.

### III. LAW OF IN-AND-IN BREEDING, WHERE BOTH PARENTS ARE OF THE SAME FAMILY.

The third law, namely that of in-and-in breeding,



operates where *both parents* are not only of the same variety, but of the *same family in its narrowest sense*, and when the *female* gives always the *backhead and locomotive organs*, and the *male*, the *face and nutritive organs*—precisely the reverse of what takes place in crossing.

Among the facts in support of this law of in-and-in breeding, may first be mentioned this, that when the male is enfeebled, he no longer gives character to the progeny, and that he always becomes enfeebled by breeding in-and-in, and even loses reproductive power.

Speaking of breeding in-and-in generally, Sir John Sebright says, “I have no doubt that, by this practice being continued, animals would, in course of time, degenerate to such a degree, as to become incapable of breeding at all.

“I have tried many experiments, by breeding in-and-in upon dogs, fowls and pigeons: the dogs became, from strong spaniels, weak and diminutive lap-dogs, the fowls became long in the legs, small in the body, and bad breeders.

“There are a great many sorts of fancy pigeons: each variety has some particular property, which constitutes its supposed value, and which the amateurs increase as much as possible, both by breeding in-and-in, and by selection, until the particular property is made to predominate to such a degree, in some of the most refined sorts, that they cannot exist without the greatest care, and are incapable of rearing their young, without the assistance of other pigeons, kept for that purpose.”

Mr. Knight (21, December) says, that in breeding

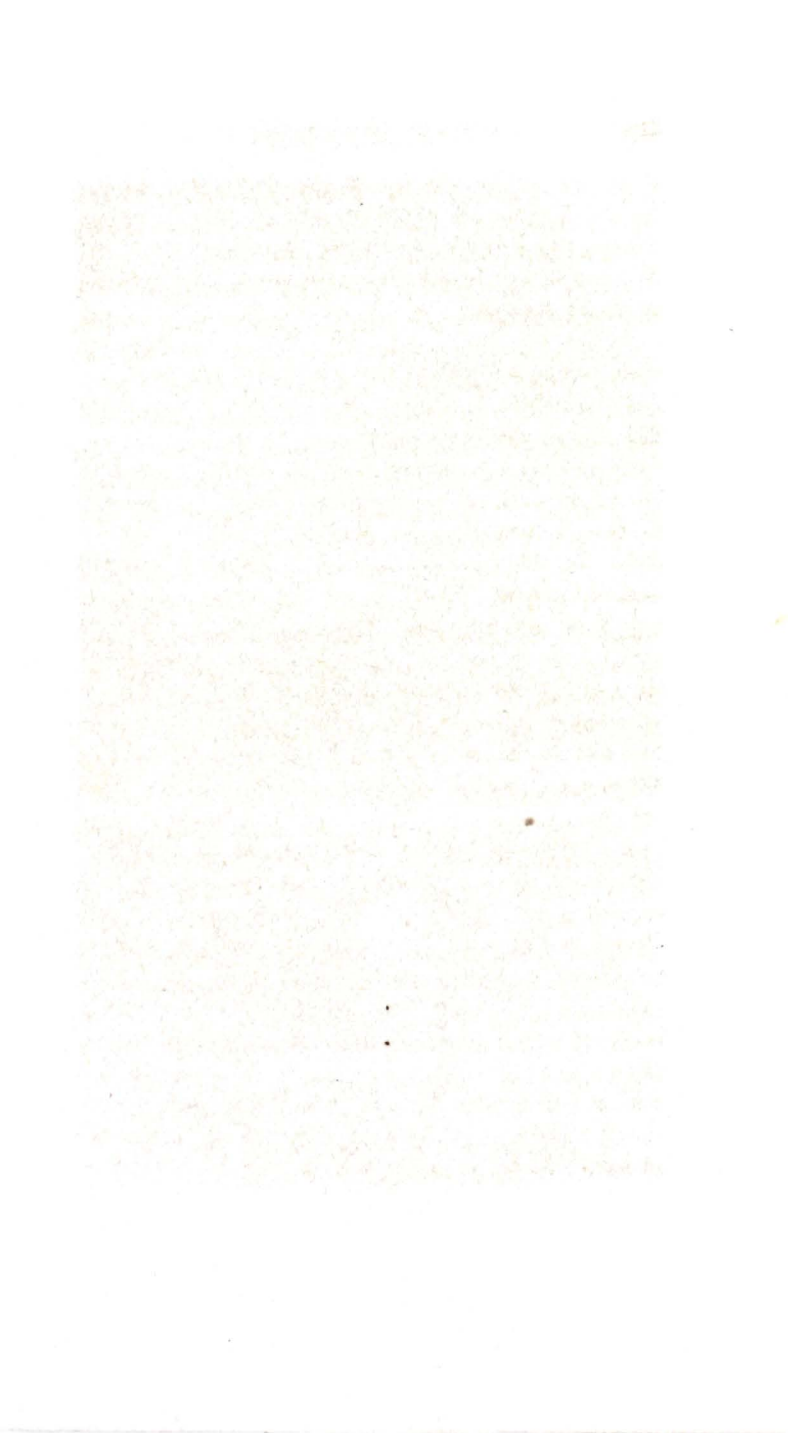
in-and-in, "The animals in all cases gradually acquired, though with some irregularity, more dwarfish habits; and I think it probable that barrenness would ultimately have occurred, as Sir John Sebright observed in pigeons."

"Close breeding," says Mr. Berry, "impairs the constitution, and affects the procreative powers."

In in-and-in, I believe that the generative power fails *first* or *chiefly* on the part of the male.

Although the voluntary and locomotive power of the female is never so intense as that of the male, it is more frequently and repeatedly in action. In the male, the reproductive impulse is that of a moment, and exhaustion follows it: in the female, it can at any time be repeated. The vital and reproductive systems are in fact the largest and most essential portions of her organization; but by no means of his. It is evident, therefore, why, when voluntary power is lessened in the male, it may be exceeded by that of the female; so that the failure is first or chiefly upon his part.

In further support of this view, Mr. Knight (21, December) says, "You are, I think, probably right in supposing that the powers of the male would first fail, though in nine cases of barrenness out of ten or more, the defect is in the female."—And again (21, February, 1838) "I have had reason to believe that in breeding in-and-in, to an injurious extent, the powers of the male fail first. I once, in the same season, reared two young bulls, of which the parents were nearly related; and both proved perfectly impotent; at least both failed to beget a single calf, though the





young females bred well enough, whilst young, at least."

Now, as no being can desire that of which it is already in possession,—as, in animals bred in-and-in, there is little or no difference, little or nothing to be desired,—as no being can feel sexual excitement towards itself, and little toward that which is like itself,—as organs unexcited do not act,—it is not to be wondered that, in in-and-in, the male no longer stamps his voluntary and locomotive systems upon the progeny.

In mentioning to Mr. Nash (the intelligent dealer in birds already spoken of as to crossing,) the circumstances, that even in crossing, a feeble male lost the power of giving form to the progeny which was thus imparted by the female, and that Sir John Sebright had observed the loss of generative power in breeding in-and-in; and, on further stating to him my expectation that, in progeny produced by breeding in-and-in, the male chiefly would be debilitated, because, in his vigour, he possesses voluntary power in the highest degree, and organs exercised in excess are most liable to debility, &c.;—this intelligent man corroborated my views by stating that the last birds produced by any pair always resemble the female; that wherever in-and-in breeding exists, this resemblance is extremely remarkable; that, among bantam fowls, the cocks lose their chief characteristic, the hackle and streamers, and more resemble the hens; that more hens also than cocks are produced, &c. See Plate VIII., in which figure 1 represents the cock; figure 2, the hen;



and figure 3, the cock approaching the hen in appearance.

As it is in the close in-and-in practised by the breeders of these fowls and of pigeons,—an in-and-in, where both parents are of the same family in its narrowest sense, that the injurious effects of in-and-in breeding are best demonstrated, I avail myself of these examples both to corroborate this law and to show the errors which careless breeders are apt to commit in their representation of facts.

To a breeder, was put the following question. “If bantams are bred in-and-in, what effects happen to the plumage of the cocks and hens?” The breeder’s answer was, “None to the plumage: all our fancy bantams throw chicks black and yellow, or white and black.”—To this Mr. Nash’s reply was, “Chicks white and black are what breeders term foul birds. The person answering your question is therefore not aware of what are deemed essential qualities in the bird.”

The next question put was, “Do the long tail feathers of high-bred cock bantams grow as in other cocks?” The breeder’s answer was, “The fancy bantams have no rump hackle, or what are called streamers in the tail. Cocks and hens resemble each other in plumage and all other respects. By chance, a long-feathered bird is bred with rump hackle and streamers in the tail.”—Mr. Nash’s reply was, “It is not wonderful that a breeder having such progenitors, should have such a progeny as described in the answer to your question. No cock bantam is perfect who has not the rump hackle and streamers.”

The last question was, "Are there more hens than cocks in such in-and-in broods?" The breeder's answer was, "This is uncertain: there are sometimes more cocks; at other times more hens."—Mr. Nash's reply was, "In the closest and strictest in-and-in, the hens always predominate;" and he pointed out cases in proof.

These remarks will show the necessity of care in all such inquiries.

It appears surprising that nearly perfect animals, breeding in-and-in, should cause degeneration. But the loss of excitement explains it.—*The reproductive power is enfeebled; and upon that, the whole organization of the animal depends.* HENCE NEARLY PERFECT BEINGS WOULD INEVITABLY DEGENERATE.

I formerly stated that *organization is nearly indestructible*; and, from that, it follows that the faulty organization of the whole human race cannot easily or soon be got rid of, though individuals and families may, and, in proportion to their knowledge, will improve. Improvement of their race will be the prerogative of the highest minds, and will be more eagerly sought for than ever was the improvement of the inferior animal breeds.

I have now shown that, in the nearly perfect animals, who must therefore be proportionally similar in all respects, loss of excitement would ensue, the reproductive power, on which the whole organization depends, would be enfeebled, and therefore nearly perfect beings would inevitably degenerate.

I little dreamed of this when, in early life, I listened

to the earnest and eloquent arguments of Godwin, in behalf of the perfectibility of man!

In considering in-and-in breeding in its intimate nature, it is evident that, if close and strict, it abandons that method of difference between the two conjoined beings, which I have shown to be necessary to excitement and reproductive power, and adopts the method (not of similarity—for that I have shown to be essential to the production of any breed, but) of *quasi* identity.

To explain this, let us take one of the strictest examples; the reader only bearing in mind—that the hypothesis of blood is nonsense—that organization takes its place—that that organization is propagated in masses—that these masses are two in number, namely, the anterior and the posterior series of organs—and that consequently, organization is propagated in halves.

Let the example be that in which, of the animals subjected to in-and-in breeding, the father breeds with the daughter, and again with the grand-daughter. Now, it is certain that the father gives half his organization to the daughter, (suppose the anterior series of organs,) and so far they are identical; but, in breeding with that daughter, he may give the other half of his organization to the grand-daughter, (namely, the posterior series of organs,) and as the grand-daughter will then have both his series of organs—the former from the mother and the latter from himself, it is evident that there exists between the male and his grand-daughter a *quasi* identity.

I say nothing of the moral antipathy which this would produce in intelligent beings, because morals have their foundation in physics, and we have nothing here to do with beings of such perceptions. I dwell only on the identity being so perfect as utterly to destroy all the differences which are essential to excitement and reproductive power, the loss of which thus characterises in-and-in breeding.

The case of brother and sister breeding together is nothing to this. For if the brother has the anterior organs of the mother and the posterior of the father, while the sister has the anterior organs of the father and the posterior organs of the mother, or vice versa, there is scarcely any resemblance between them! and if, on the contrary, both have the same series of organs from the same parents, then they are merely similar, and neither, as in the case of grand-father and grand-daughter, *quasi* identical. In the former case, no organ has been communicated from one to another: in the latter case, every organ has been so communicated.

Now let us see how far the common doctrine errs in this respect, by quoting the words of one of its ablest followers—Sir John Sebright.

“Mr. Meynel’s fox-hounds are likewise quoted as an instance of the success of this practice; [in-and-in breeding,] but, upon speaking to that gentleman upon the subject, I found that he did not attach the meaning that I do, to the term in-and-in. He said that he frequently bred from the father and the daughter, and the mother and the son. This is not what I consider as breeding in-and-in; for the daughter is only half of



the same blood as the father, [that is, she is to the extent of one half, identical with him!] and will *probably* partake, in a great degree, of the properties of the mother. [She *certainly* will just to the same extent.]

“Mr. Meynel sometimes breeds from brother and sister; this is certainly what may be called a little close, [I have, in the third paragraph preceding, shown that they may either be entirely different or very similar—that, to adopt the vulgar phraseology, they may either have no common blood, or the whole of it!] but should they both be very good, and particularly, should the same defects not predominate in both, but the perfections of the one promise to correct in the produce the imperfections of the other, I do not think it objectionable. [Now, if the one can thus correct the other, they must have the anterior and posterior organs from different parents; and it is precisely by putting together such pairs that the parents, —Herefords and Alderneys, &c. are re-formed as Sir John himself complains!] Much further than this, the system of breeding from the same family cannot, in my opinion, be pursued with safety.” [But Sir John soon recommends a proceeding, which carries it much further.]

Speaking of producing variety in a breed, he says, “If the original male and female were of different families, by breeding from the mother and the son, and again from the male produce and the mother, and from the father and the daughter in the same way, two families sufficiently distinct might be obtained; for the son is only half of the father’s blood, and the



produce from the mother and the son will be six parts of the mother and two of the father." [There is no such thing as six parts of blood, or properly of organization, in the production of progeny—the son, as already shown, will have half the mother's organization, and the grandson may have the whole, but can have no quarters.]

I must not here pass over the circumstance, that there is, on the part of a distinguished individual, my correspondent, \* \* \*, a difference of opinion as to the effects of in-and-in breeding. In a letter of the 11th January, he writes as follows, in reply to the questions prefixed.

"In in-and-in breeding, where the male and female are of the same family, does it not appear, that the female always gives the general shape and character to the progeny?"—Answer: "As far as my experience goes, certainly not. My herd of cattle is all of the same family, and I should be inclined to say that, with the exception of the produce of some very few cows, the produce generally are like their sires. The same applies to my flock of sheep, and I have bred from rams from the same flock in Leicestershire, for fourteen years, which flock has not had a cross since the year 1799."

It is very evident, that \* \* \* does not use the term in-and-in in its common meaning. In-and-in applied to cattle, sheep, &c. in its closest application, is, as observed, where the father breeds with the daughter, and again with the grand-daughter; or the mother with the son and again with the grand-son. In the first of these cases, the father gives half of his

organization (say the locomotive system,) to the daughter; and, while this is imparted by her to the grand-daughter, he gives to the latter the other half of his organization. (Namely, the vital system.) Thus the father and the grand daughter are *quasi* identical in organization; and, in breeding with her, he may be said actually to breed with himself. And such is the case with the mother and her male progeny. It is from such cases that the worst consequences ensue, nor can it be wondered at.

The herd and flock of \* \* \* originated in a cross; and the object is not to destroy that successful cross by a new one, but to maintain it. Both herd and flock are numerous, spread over a considerable surface, and liable to all the variations which Mr. Knight and Sir John Sebright describe. The operation, therefore, which the latter terms selection, and which is as far from in-and-in as it is from a new cross, is all that is necessary to maintain the good effects of the original cross.

“In in-and-in, does the generative power fail first or chiefly in the male?”—Answer: “I have not found that it fails in either. In in-and-in breeding, the breeder must be careful not to use animals with bad constitutions in their families, or he will double the evil; but if he avoids this, I have never perceived any objection to it.”

This is not to be wondered at in an in-and-in so loose or remote as this—amounting in reality to a mere case of selection after a cross.

“In in-and-in, is it the female form and sex chiefly that are imparted to the progeny?”—“This is answer-

ed as to form, above. As to sex, my herd of cattle are in-and-in bred, and, for the two years preceding the present, I have bred two bull calves at least to one cow. The exact numbers are, in 1835, 1836 and 1837, 172 calves, of which 66 were females."

In a case of selection so obvious, and from the magnitude of the herd so likely to be efficient, this also is natural.

"You will perceive that my experience leads me to differ very much with some very great authorities. I may therefore probably be wrong; but it is better that I should tell you my own opinion, such as it is, than that I should only repeat the opinions of others. I differ, I know, very much from most people about the mischief of in-and-in breeding. But I know that all the great improvements which have been made in our breeds of domestic animals by Bakewell, Culley and Colling, and I have no doubt also by Elman, have been effected originally by breeding in-and-in, and I believe, by attending to the precaution I have referred to in my answer to one of your questions [not to use animals with bad constitutions in their families,] it may be safely continued, and with much greater certainty of producing animals of the shape and qualities desired, than can be effected in any other way."

As already stated, the difference here expressed is only an apparent one.

On this difference as to in-and-in breeding, I have only to add that, on explaining to \* \* \* the sense in which I use that term, he replied (23, February, 1838) "You are perfectly right in supposing that I did not

understand the term breeding in-and-in so strictly as you do."

Thus crosses have originated most of our good breeds; and selection has long maintained them. A cross is the operation of a moment comparatively, and, its ends attained, the breeder's object is not to repeat it, but to maintain it; selection, which effects this, may and should be the operation of many years.

The reader, then, has now seen under what circumstances the *female* has been observed to give *character* to progeny—that, in in-and-in, closely and strictly enforced, it is the *female form* and *sex* chiefly that are imparted to progeny.

But it is also evident, that in-and-in, closely and strictly enforced, is worthless in breeding, because it is accompanied by enfeeblement, loss of reproductive power, &c.

The female, however, may also give her locomotive system, character or shape to progeny, simply by being relatively more vigorous; and this was probably the foundation of the ancient practice, seeing that Virgil says,

"Seu quis, Olympiæ miratus præmia palmæ,  
Pascit Equos, seu quis fortes ad arata Juvencos,  
Corpora præcipue matrum legat."

The great improvement of the Turks in appearance, is probably not merely the result of their intermarriages with the women of Tschercassia, Georgia, &c. but of the fact that polygamy, by enfeebling the male, permits the female to stamp her form more generally upon the progeny.

Vast disadvantage, however, must attend this method, since it implies the relative debility of the male parent. Hence, probably the Turks are a degenerate race. And hence certainly, the general superiority of modern horse-breeding, which places its trust chiefly in the male parent; for, as I have shown, *when both sexes are in their highest vigour and perfection, it is the male that predominates in giving the locomotive system, character or shape to progeny, and it is preferable that the female should give that system, the vital, which in her is always most developed.* This is the philosophical basis hitherto unassigned of the superiority of the modern practice.

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In thus concluding the first three laws, I must observe, that I have rested my inferences on no hypothetical views, but on the following facts:—

1st. I have shown, by the most indisputable evidence, that, in selection from the same variety, the father sometimes gives the locomotive system and back-head, and the mother the vital system and forehead; (which is generally preferable, because it is in these systems respectively that each excels) as well as that the mother sometimes gives the locomotive system and back-head, and the father the vital system and forehead.

Here, then, in regard to a subsequent question of Mr. Knight, as to the communication of life,—if life be the function of the vital system, it may be given by either parent, though I should think that dependent



on the preceding volition which arouses the first sensation.—But be that as it may—here are indisputable proofs of the parents communicating their organization in two totally opposite successions and combinations, which faithful drawings render evident to every one.

2ndly. I have shown that, in strong crosses, if the male parent be merely as young and vigorous as the female, the male always gives the locomotive system, the female, the vital system; (which is also as it should be, for the reason above assigned) and this is exemplified from the mulatto and sambo down to the goldfinch and canary mule, or the skegger, as drawings also show.

3rdly. I have shown that, in in-and-in breeding, long continued, the female gives the locomotive system, the male, the vital system; (which is attended with the disadvantage above explained) as is shown in bantams, &c.

Thus we have, I will not say life, for that is merely a general term, but the two series of organs on which both life and locomotion respectively depend, in two opposite successions and combinations—variably in beings of the same variety, and invariably both in different varieties, (crosses) and when closely and long restricted to one family (in-and-in.)

In this, I trust to nothing but facts, which can be represented on paper, and the truth of which the eyes will declare without even troubling the judgment.

## IV. LAW OF SEX.

There is another great distinction to be accounted for, namely the **DISTINCTION OF SEX**. This is as closely connected with the nutritive, as the distinction of mind is with the thinking system.

The consideration of life in some of its relations, is here a necessary preliminary ; and as I have the most profound respect for the experiments and opinions of Mr. Knight (expressed in letters, 24, November, and 1 and 29, December,) they may not be passed over unnoticed.

“I have ascertained,” he says, “by many experiments, some of them perfectly decisive of the question, that a plant may have two, and I believe many more male parents . . . that is, each is in part the parent of the offspring.” He adds, “When I have introduced the pollen of a coloured pea and of a white pea into the blossom of a white pea, I have found some of the peas of the same pod to afford white, and some coloured offspring ; but whether any of these were of common parentage, I am not prepared to say.

“I proceed to state an experiment made upon dogs, which appears to me of considerable weight. The experiment, however, as I saw little utility to be derived from it, was only once made : I have rarely engaged in any experiment where I did not expect to derive some immediately useful information.—I had a female spaniel, a perfectly canine Messalina, which, contrary to what is common amongst animals of that species, was no more disposed to grant favours to one suitor than to another. I first put to her one dog, a terrier,

with broken, rough, strong, grey hair, and I instantly afterwards introduced a springing spaniel, whose colour was white, with dark liver-coloured spots of large width. The female was of a light liver-colour.—Many puppies were the produce of the experiment; the greater part of which appeared to be obviously the offspring of the terrier; [the male parent, according to my preceding law of crossing] but two appeared to be perfect spaniels very similar in colour and character to their *supposed* male parent. These were reared; but as they grew, they gradually acquired more and more of the mongrel character; their temper was not that of spaniels, and they were quite worthless. They had, in short, terrier blood to some extent in their veins . . . The circumstance of each dog having apparently affected the character of all the offspring, is scarcely consistent with the hypothesis which assumes the first organized point to be [in any case] given by the male, as two males cannot *jointly* give it. I am, therefore, much disposed to believe that the male only modifies that which was previously formed.

“I am wedded to the opinion, that nature acts with uniformity in the way in which life, or the power of acquiring an independent existence, is given to the first organized point, or, as I may better express it the first organization. I cannot believe that life is sometimes given by the male, and sometimes by the female parent. In everything which has come under my observation in experiments upon plants, nature, in all cases (subject to infinite variety of structure) has accomplished all its objects by the most simple means. The seed-vessel is in some cases very distinct from

the point to which the pollen is applied. In the *colchicum autumnale*, the distance is not less than twelve inches, and the long thread is very slender. A glutinous fluid is emitted, into which the globules of pollen fall and explode; this fluid is re-absorbed by the plant; and the seed acquires its proper organization and powers. The transmission of an organized body through the long slender thread above described, appears an awkward process, dissimilar to those usually employed by nature; and I conceive that when a plant or animal is the offspring of two male parents, the female parent *must* give the first organized body. I cannot avoid believing that this is done in the eggs of birds and spawn of fish and insects. The liquid of the male silkworm operates upon the eggs after being laid."

With these views, of the first organization being given by the female, and life being given by the male, Mr. Knight very beautifully says, "Were I to be born again, I should wish to descend, as I do on my mother's side, from a healthy race, whose station in society had been through many generations, a little above that of peasants, and from a father whose mind, as that of his ancestry, had been much exercised in arguments of various kinds."

First, then, it appears to me that the making of life an essence, a thing *per se*, a sort of unnecessary second soul, is not in the spirit of advancing philosophy. It is in the same spirit, indeed, that some speak of the matter of electricity, the matter of galvanism; but I think I refuted that notion, above twenty years ago, in Thomson's *Annals of Philosophy*, by showing



that these are merely the actions of well-known elements—those namely of atmospheric air and of water.

Life is not a thing, but merely a general term, expressing the aggregate of the actions of the tubular organs of plants and animals. In reproduction, therefore, there is nothing to be given exclusively either by the male or the female. The first act of life in the new being is apparently the result of the mutual relation and influence of the otherwise inactive things or molecules given by each. One molecule with opposite poles *may* attract the corresponding poles of another; a ring *may* thus be formed; and ring added to ring *may* form a tube, &c. &c. &c. But, to shun hypotheses, whatever these inactive things or molecules may be, a globule of pollen, or a drop of albumen, it is evident that the more *passive* one, whether of the male or female, will be more readily associated with *sensation* than *volition*, because the former of these necessarily implies impression received by it *from* something else, and that the more *active* one will be more readily associated with *volition*, because that as necessarily implies motion communicated by it *to* something else. And as life is inseparable from sensation (hence the vital organs, the viscera of the trunk, go with the organs of sense;) so is motion inseparable from volition (hence the locomotive organs, the muscles, &c. go with the organ of volition, the cerebel.) Life is, therefore, the result, not of solitary, but of mutual action; and power, and perhaps precedence, in whatever parent it may occur, communicates that motion which impresses and gives sensation, or in other words, originates life.



On this subject, a general consideration of the embryo seeds of plants and ova of animals may mislead. We are apt to think there is something more in these comparatively large bodies than in one globule of pollen, or in a seminal aura or vermicule ; but this is not at all probable. The former is larger and of obvious and definite form, because it contains not only the female reproductive atom, but the matter that nourishes both atoms, the cotyledon, or yolk, and, in some cases, the liquid in which they swim, &c. The globule of pollen of the *colchicum autumnale*, or a molecule from the exploded globule, is probably as large and as efficient as the female molecule with which it combines. It will prevent mistake on that head, to compare the mass of the hen's egg with its *punctum saliens*, which comprises molecules both of the male and the female.

The supposition of two male parents may possibly be a source of error on this subject.—If the case of the white and the coloured peas be one of the most distinct proofs that a plant may have two male parents, that statement must, I imagine, be made with great modification ; for it seems only to prove that any pea in the same pod may have a distinct male parent, and Mr. Knight, indeed, “doubts if any one was of common parentage.”—As to the case of the terrier and spaniel, the probability seems to be that all the puppies were the progeny of the terrier ; that the majority resembled the male parent, according to the law of crossing which I have announced ; and that two resembled the female parent, receiving from her, not from the springing spaniel, their charac-

ter and colour. These had the terrier's temper, because they derived the least apparent portion of their organization, the vital system, from him; and if those, like the terrier in general character, had been reared, they would, to similar extent, have been found to resemble the spaniel mother, because they also derived the least apparent portion of their organization, the vital system, from her. If the spaniel looking puppies had even perfectly resembled in colour the springing spaniel, that would be easily explicable without the supposition of two fathers, by the mere influence of the springing spaniel's colour on the mother's imagination (as half granted in the following paragraph by Mr. Knight himself;) for there are various proofs that the colour of a dog may so operate upon the imagination of a bitch in the state of œstrum as to influence the colour of her progeny, he himself being carefully secluded from all sexual connexion with her.

Mr. Knight, however, has some doubts at least as to the double male parentage of animals; for (16, April) he says, "The result of some experiments which I made many years ago satisfied me that an animal offspring might have two male parents; but the influence of the quagga, in the case of Lord Morton's mares, has to some extent excited doubts."\*

So far, therefore, the first organized point must still be given by one male parent—must be one and indivisible; and thus power and perhaps precedence, in whatever parent it may occur, communicates that

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\* In fact, the interference of male parents is impossible: nature has carefully provided against it.

motion which impresses and gives sensation, or originates life.

Even superfœtation, or the production of distinct offspring by a second male parent, "Cassan," says Beck, "considers possible only, 1, where there is a perfect double uterus; 2, where there is a pre-existing extra-uterine pregnancy; and 3, when there is a new conception before the fecundating germ has occupied the cavity of the uterus. The experiments of Haller, Hunter and Haighton, and more recently of Home, John Burns and Magendie, prove that the ovum sometimes does not descend into the matrix until eight, fifteen, or even twenty days after fecundation."

But let us look to the facts on this subject.

"A case," says Beck, "mentioned by Buffon, has been often quoted by the enemies and advocates of superfœtation. A female at Charleston, in South Carolina, was delivered, in 1714, of twins within a very short time of each other. One was found to be black, and the other white. This variety of colour led to an investigation; and the female confessed, that on a particular day, immediately after her husband had left his bed, a negro entered her room, and, by threatening to murder her if she did not consent, had connexion with her."

Now it is well known, that the offspring of a black and a white may be either black, or white, or mixed, or even spotted. It is therefore evident that, in this case, both children may have been the progeny of the negro.

"Dr. Moseley," says Beck, "mentions the following as occurring within his time, at Shortwood estate,

in the island of Jamaica. "A negro woman brought forth two children at a birth, both of a size; one of which was a negro, and the other a mulatto. On being interrogated upon the occasion of their dissimilitude, she said she perfectly well knew the cause of it, which was, that a white man belonging to the estate came to her hut one morning before she was up, and she had connexion with him almost instantly after her black husband had quitted her."—Here, both were probably the children of the white man.

"The following is, I believe, the most remarkable case yet recorded. 'It was communicated to me,' says Dr. Walsh, 'by the Sargenté Mor of the St. Jose gold-district (Brazil.) A creole woman, with whom he was acquainted, in the neighbourhood, had three children at a birth, of three different colours, white, brown, and black, with all the features of the respective classes.'"

If by "brown" here were meant tawny or the usual mulatto colour, a negro might have produced the whole. But if, "the respective classes," is meant to imply a European, an Indian, and an African father! it is a great absurdity.

"It is urged," says Beck, "that shortly after conception, the os tincae, as well as the internal apertures of the fallopian tubes, are closed by the deposition of a thick tenacious mucus. The membrana decidua is also formed early, and lines the uterus, and thus co-operates with the mucus, in obliterating the openings into its cavity.

"When [in a more advanced stage] the gravid uterus enlarges, the fallopian tubes lie parallel to its

sides, instead of running in a transverse direction to the ovaria, as in the unimpregnated state. If then an embryo be generated, the tubes could not embrace the ovum, and it would remain in the ovarium, or fall into the abdomen, and thus constitute an extra uterine conception.

“But again, it is said that, even if we allow the practicability of the new embryo reaching the uteris, its arrival would be destructive to the fœtus already present. The functions which have already been performed for the first conception have now to be repeated, and an additional decidua and placenta are to be formed.

“An appeal, however, is made to cases, where, as we have already stated, two or more children of different sizes, and apparently of different ages, are born nearly at the same time, or at a longer interval.

“It will be observed that, in one class of instances, the lesser child is represented as dead and decayed, and its size is much smaller than the accompanying birth. Now, in these, it is suggested that twins have been conceived, and that the embarrassed situation of one child in the matrix may have prevented its developement, checked its nutrition, and thus caused its death. The other, on the contrary, lives and grows, presses on the dead one, which becomes flattened, or wholly or partly putrified; and in this condition, both may be expelled at the same time, or one may be detained for some time after the other.—It is evident that this explanation puts aside the idea of superfœtation.

“There yet remain some cases which require ex-



planation. It has been attempted to give this, by supposing that a double uterus was present. This is far from being as rare as was at one time supposed."

The next preliminary circumstance to be noticed is Mr. Knight's supposed paramount influence of the female parent over sex.

"The female parent's influence upon the sex of the offspring in cows," says he (1, December,) "and I have reason to believe, in the females of our other domesticated quadrupeds, is so strong [and if in them, of course, in woman,] that it may, I think, be pronounced nearly positive; but I doubt its being quite independent of external causes, operating, however, upon the female alone."

In the Philosophical Transactions, 1809, Mr. Knight says, "In several species of domesticated animals (I believe in all,) particular females are found to produce a majority of their offspring of the same sex; and I have proved repeatedly, that, by dividing a herd of thirty cows into three equal parts, I could calculate with confidence upon a large majority of females from one part, of males from another, and upon nearly an equal number of males and females from the remainder. I frequently endeavoured to change the habits by changing the male, without success."

In a letter of the 22d of May, Mr. Knight says, "I saw my relation Sir John Sebright, who has made, at different periods, a great variety of experiments upon breeding animals; and he informed me that he had latterly made many experiments with the object of testing of my opinion, that the female parent gives

the sex to the offspring, and that the results of his experiments wholly agree with mine."

Mr. Blaine says, "some dogs, some stallions, and some bulls, are remarked for getting a greater number of males than females; while others are the parents of more females than males."—This might be supposed to imply predominance on either side.

As to mankind, he observes, that, "in King's Langley church, are the effigies of seven successive daughters born to a man by his first wife, and of seven sons born to him by a second wife, in succession."—This also might be supposed to imply predominance on either side.

In a letter from Sir Anthony Carlisle, he says, "I am intimate with a family in which the father and mother had only two children, a son and a daughter, who each married into families not related to either party, and have had fifteen daughters without one son—viz. eight by the son, and seven by the daughter."—This might be thought to look as if daughter-begetting were a prerogative of the family.

In the *Philosophical Transactions*, 1787, mention is made of a gentleman who was the youngest of forty sons, all produced in succession, from three different wives, by one father, in Ireland.—Here, assuredly, son-begetting seems to be a prerogative of the father.

Mr. Knight himself exempts mules from the maternal influence, which he supposes to operate in other cases. He says (1, December,) "Respecting mule ducks, though the eggs would have produced nearly an equal number of male and female offspring, if the common drake had been the parent, the eggs produc-

ed six out of seven (sometimes less) of male offspring, when the musk drake was the parent. I observed the same occurrence in mule birds, the offspring of a male goldfinch, and the female canary bird."—Now, as I regard mules as only a cross *in excess*, this is perfectly conformable with my views.

As to the influence of external causes, it is very likely to affect the relative abundance or energy of their means of reproduction on whichever parent it directly operates.

In support of that influence as operating directly on the female parent, Mr. Knight (23, November, and 1 and 4, December) says, "I have stated a case in the Philosophical Transactions, in which two cows brought all female offspring, one fourteen in fifteen years, and the other fifteen in sixteen years, though I annually changed the bull. Both, however, produced one male each, and that in the same year; and I confidently expected, when the one produced a male, that the other would, as she did."—To me this case does not prove that the female was the parent influenced.

"Huber discovered that, if the period of the queen-bee's impregnation was retarded, all the eggs afforded male offspring; and that the eggs last laid by the queen-bee produced male offspring only. All the last laid eggs of the queen-wasp afford either male, or efficient female, offspring, that is, females capable of living through winter after receiving the male, and of laying eggs in the following spring. Bees, moreover, can take any egg, which would have produced a labouring bee, and make an efficient queen of it, provided the egg be not more than three days old."

It must be observed that, in the retarded impregnation of the queen-bee, her reproductive functions are not more retarded than are those of the males; and the male progeny might therefore be supposed to arise from either cause. The statement, that, even in ordinary cases, the last laid eggs, or the second laying, produce male offspring only, leaves it equally uncertain which is affected.

“I have, in the Philosophical Transactions, stated the fact of cucumber and melon-plants affording all male blossom, if vegetation be accelerated by heat, and all female, from the same points, if the progress of vegetation be retarded by cold.—Nature, in vegetable life, deals more in transmutation than in primary distinct formations. A leaf-bud becomes a flower-bud, and the blossom of the apple is formed out of five embryo leaves, the points of which form the eye of the apple. Every bunch of grapes is a tendril first, and may be made to act as such. I have witnessed all the changes in this and other cases of similar kinds.”

These are indisputable proofs of the power of external influences; but it is necessary to be careful in reasoning from such phenomena in the lower beings, as in them reproduction is more exposed to external influence; an important part of the reproductive process being in some of them performed externally. It seems to me most probable that *in the higher animals*, these influences act only *at the moment of reproduction*, as well as that they may act *on either parent*. Hence the power which has been already noticed, apparently either of female or male over sex. They probably affect the nutritive system, by increasing the abun-



dance of sexual secretion, in the male or female parent.

Among the Greeks, Empedocles, Epicurus, and various other physiologists, in the doctrine of epigenesis, endeavoured to show that parents respectively contribute reproductive fluids which co-operate in generation, and stamp the fœtus male or female, as either is more copious.

Such was the opinion of many of the ancients; and Lucretius says,

*"Et muliebres oritur patrio de semine seclum;  
Maternoque mares existunt corpore cretei.  
Semper enim partus duplici de semine constat:  
Atque, utri simile est magnis id, quodcumque creatur,  
Ejus habet plus parte equâ, quod cernere possis,  
Sive virum suboles, sive est muliebris origo."*

This certainly would accord with a statement often made, that the male, having in youth and old age, less power over the produce of conception than at the period of his force or of his greatest manhood, the female at those times obtains the preponderance, the result being that more girls are then born; whilst, on the contrary, the proportion of boys is greater during the time that man is in his flourishing period of life.

It would accord also with the fact, that, in polygamous nations, more female than male children are produced.

It would accord likewise with the report of most breeders, that, when the male is most vigorous, most males are produced.

It would accord, moreover, with the conclusion drawn from some experiments lately made in France



on sheep, by which it appears that sex depends, in some measure, on the comparative vigour of the parents.

Even, in hybrid plants, Koelreuter says, he has produced or diminished paternal resemblance by increasing the quantity of impregnating dust.

Now, all of these facts appear to be valuable ; but previous to an accurate appreciation of them, or deriving from them all the aid they are capable of giving in determining the law of sex, it is necessary to state an important fact which has been hitherto unobserved, and which indeed could not be observed so long as it was not known, that one parent gave to progeny the vital system, and the other, the locomotive system.

It is this, that though, in the same variety, the male parent may give the vital system to progeny, yet it may have the female sex ; and, though the female parent may give the vital system, it may have the male sex.

This is a remarkable fact, because the organs of sex and reproduction are mere appendages to the vital system. Like the rest of that system, they are tubular organs, which transmit or transmute liquids, and which act by a pulsating or peristaltic motion. The testes and ovaria, in fact, are glands—an important portion of those which properly constitute the third order of vital organs.

It seems strange, then, that the parent giving the vital system, should not invariably give the sex. It looks, at first, as if one portion of the vital system, could be dislocated from another ; and there appears

no reason for anything so contrary to prevailing analogy.

There is here, however, no irregularity ; and the parent giving the vital system, primarily at least, gives the reproductive one.

To explain this, let me observe, that all vital and locomotive action has been observed to depend on nervous action.—Locomotive action generally depends upon conscious sensation and volition ; for which purposes the sensitive fibres ascend to the brain, and the voluntary fibres descend from the cerebel. But the sensations of the vital system, being generally unconscious ones, and its motions generally involuntary, it obtains a new and totally distinct nervous system of its own, which is called the sympathetic system—its nerves of unconscious sensation arising from all points of the vital organs, and terminating in small knots or little brains, called ganglia, situated about the central parts of the trunk, generally near to the spine, and its nerves of involuntary motion proceeding from these little brains, and terminating in the same points of the vital organs.

Now, as all the parts of the vital system are under the immediate control of this new and distinct nervous apparatus, having its own ascending and descending fibres, which regulate its own receivings and givings, (just as the receivings and givings of the general system, its sensitive and voluntary actions, were regulated by its ascending and descending fibres,) it will be seen to be the interference of this new apparatus that causes the seeming independence of sex on the vital system. The communication of female sex which

receives, and that of male sex which gives, are now respectively as much dependent on the nerves which proceed to the ganglia, and those which proceed from them, as sensation and volition are respectively dependent on the fibres which ascend to the brain, and those which descend from the cerebel.

If there be any doubt as to the strict analogy between the powers of these two nervous systems, let it be observed, that, as general action is dependent on the greater nervous system, vital action is dependent on the less or sympathetic system; that, as the greater nervous system operates by the levers of the locomotive system upon external bodies, the less nervous system operates by the tubes of the vital system upon internal ones, namely, the contents of these tubes; that, as external bodies are the subjects of sensation and volition in the former case, so the contents of these tubes are the subjects of absorption and secretion in the latter; and that, if the less or sympathetic system did not thus regulate absorption and secretion, in lieu and independently of the greater system, it would be useless.

From all this, it will be seen that, according to the particular receiving or giving action—in this case the absorbing or secreting power, of the vital system, it will, independent of that general communication of that system to the new being, and dependent only on its own internal relations, regulated by its own nervous system, confer the receiving or the giving sex. Thus the parent giving the vital system, will also give the sex, whether that differ from its own or not. The

male, accordingly, may give either male or female sex; and the female the same.

In doing this, it would, from all that has been said, appear, that as, in the general character, the predominance of sensation or volition depends on the relative energy of the parent, and immediately perhaps on that of his reproductive liquid,\* so in sex, the distinction of male or female depends on the relative quantity of that liquid. On nothing, indeed, can it so rationally depend as on that which is most identical with the being which gives it. When the reproductive liquid of the male, therefore, is most abundant, he, if he give the vital system, will give the male sex, and when least so, the female—a conclusion supported by all we know both among men and animals as to masculine energy and its results. So also when the reproductive liquid of the female is most abundant, she, if she give the vital system, will give the female sex, and when least so, the male—a conclusion which is also supported by the case of women in polygamous nations, and that of female animals when the female parent is relatively strong, when in-and-in breeding takes place, &c.

In both cases, it will be observed, that each sex,

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\* "The employment of the masculine organs being a secretion," says Friedlander, "its results, like those of similar operations, necessarily depend on the sensibility of the active and animated filters that perform them; and if the saliva is more powerful when the secretion is rendered more abundant by hunger or the presence of any desired aliment, if tears are burning when produced by acute sorrow or mechanical irritation, if the saliva becomes venomous in some animals when they are angry, if several other secretions become exalted or changed in their nature when the organs are powerfully excited, can we suppose that the elaboration of the seminal liquid is not subjected to the same laws?"

giving the opposite one when its reproductive means is scantiest, will coincide with the more abundant reproductive means of the opposite sex, so that males will appear to give males, and females, females, even when they do not at all give the vital system on which it depends.

Of this doctrine, there is a remarkable confirmation in the fact, that, when, in boys, it is the father's vital system which is communicated, as observation will easily show, the external reproductive organs, in the child, will be seen obviously to resemble those of the father; but when, in boys, it is the mother's vital system which is communicated, the child's external reproductive organs will be found to have no such resemblance to the father's: they are consequently derived, along with the vital system, exclusively from the mother. This very curious and remarkable fact throws a totally new light on the production of sex.

The law of sex, therefore, appears to be, that *either sex is, along with the general vital system, given by either parent, in dependence only on these internal relations of that system.*

I may here notice two circumstances connected with generation, which are illustrated by cases of twins.

The mental and physiognomical character of progeny seems generally to depend upon a *single impulse*, as there is generally a remarkable unity or resemblance of character in twins.

Dr. Robert Lee, Dr. Sweatman, and Mr. Hallion, inform me that twins are generally alike in physiognomical character, especially if of the same sex.



This observation is also popular.—“Is this,” says Mary to Catherine Seyton, in the Abbot, “thy twin-brother as like thee in form and features as formerly?”

Dr. Copland has mentioned to me a case lately in the Middlesex Hospital, of twins of the same sex, both alike, and both having an enlargement of the spleen—by no means a common disease in children.

The sexual character of progeny is less frequently the same—doubtless because the more or less abundant secretion on which it depends, is divisible in various degrees.

Dr. Collins, in his *Midwifery*, gives a table containing 240 cases of twins, of which 140 were of the same sex and 100 of different sexes. Here, of the same sex, there is a predominance of 40; and it may fairly be said that there is a tendency toward the same sex.

#### V. LAW OF MATERNAL NUTRITION.

A certain degree of likeness generally pervades the countenances of all the children of a family.

At first sight, it would seem that there should be no resemblance between those children who have the father's forehead and mother's backhead, and those who have the father's backhead and the mother's forehead, for they have no part in common.—But such resemblance exists.

On close and frequent observation, it will be seen that this resemblance is always a maternal one, or has a maternal character; and it is doubtless derived from the circumstance that the whole of the children

of a family, are, previous to birth, nurtured by the same mother, and generally suckled by her afterwards.

This resemblance, accordingly, disappears where children have at once the opposite organization and different mothers.

## SECTION II.

### CIRCUMSTANCES MODIFYING THESE LAWS.

Some modifications are dependent on age.

It may, in the first place, be observed, that no child greatly resembles its parents at birth; and that the similarity of its features to those of its father or mother, is greatly increased as it increases in growth.

In various states of the developement of functions, a child will even resemble one parent more at one time, and the other at another time.

Every child, however, even at birth, resembles most the parent who gives the forehead and organs of sense, and gradually becomes liker the other parent as it advances in life, because the reaction of the cerebel is then more manifested.

A child is most like the parents after puberty, both because this is the age at which the child begins to resemble the adult, and because the physiognomical character is then fixed.

Some modifications are dependent on sex.

As the backhead is proportionally smaller in woman

than in man, its size, when communicated by the former to a male child, is always exaggerated.

Some modifications are dependent on the influence of the new parts added by the other parent.

If to a given forehead, a more projecting backhead and cerebel be added, the forehead will, in the progeny, be elevated and projected.

The influence of the cerebel in elevating the forehead, is evidently exerted through the cerebellic ring, &c.—as will appear from my work on “The Nervous System.”

If, to a given forehead, a broader backhead and cerebel be added, the forehead in the progeny will be broadened—by similar means.

If to a round face, a more projecting backhead and cerebel be added, the face will, in the progeny, be elongated and projected inferiorly.

The influence of the cerebel in lengthening the face, is probably exerted through the facial voluntary nerves.

If to a narrow face, a broader backhead and cerebel be added, the face, in the progeny, will be broadened—by similar means.

The influence of the cerebel over the muscular parts of the face falls under the first law of resemblance, and was there described.

The nose, I should, however, observe, sometimes presents an apparent anomaly. Not only may one parent modify the form of that organ as given by the other, as its more moveable extremity, but, in some instances, the middle part of the nose, by the influence of the new combination of organs, rises, or falls, (I

should rather say, retains through life its infantile form,) so as to deviate from both parents.

There are children, we are told, who do not resemble their father, but their grand-father; and there are nephews who resemble their uncles or aunts.

This fact has been noticed by Lucretius:—

“Fit quoque ut interdum similes existere avorum  
Possint, et referent proavorum sæpe figuras;  
Propterea quia multa modis primordia multis  
Mista suo celant in corpore sæpe parentes,  
Quæ patribus patres tradunt à stirpe profecta.  
Inde Venus variâ producit sorte figuras,  
Majorumque refert voltus, vocesque, comasque.”

The term Atavism has been adopted to describe this appearance, prevailing throughout animal races, and by some supposed to prevail among plants. M. De Candolle, however, does not consider the latter fact as fully established, but thinks it probable from analogy, and as serving, if true, to explain some remarkable appearances.

On this subject, Dr. Pritchard says, “In general the peculiarities of the individual are transmitted to his immediate descendants: in other instances, they have been observed to re-appear in a subsequent generation, after having failed, through the operation of some circumstances quite *inexplicable*, to show themselves in the immediate progeny.”

“Nor less *inexplicable*,” says Dr. M. Good, “is the generative power of transmitting peculiarities of talents, of form, or of defects in a long line of hereditary descent, and occasionally of suspending the peculiarity through a link or two, or an individual or two, with an apparent capriciousness, and then of exhibiting it



once more in full vigour. The vast influence, which this *recondite*, but active power, possesses, as well over the mind as the body, cannot, at all times, escape the notice of the most inattentive. Not only are wit, beauty and genius, propagable in this manner, but dulness, madness and deformity of every kind."

Mr. Blaine observes, that "if it were not for the irregularities which occasionally occur by mental influence, we might be led to conclude, that a family character was originally imprinted on the reproductive organs, or that the ova or germs of the future race were formed after one common hereditary mould; for it is often observed, not only among dogs, but among other domestic animals, and even in man, that their progeny bear a greater resemblance to the grandam or grand-father than to their immediate parents. . . . This tendency is greatest in the accidental varieties or breeds, in which a few succeeding generations are sufficient to destroy all appearances of variation from the original; but in breeds more nearly approaching the original, as well as such as have been long established, it requires a much longer time wholly to degenerate them. The tendency to resume the original type is, however, inherent in all our domestic animals, and in none more than the dog; and judicious efforts employed to counteract this property form a principal part of the art of successful breeding in rural economy."

The resemblance of a child to its grand-father or grand-mother, or to its uncle or aunt, has in it nothing mysterious; but depends upon one of its parents introducing a tendency to some feature, a thicker or



thinner lip, a longer or shorter nose, and darker or lighter eye, which was lost in the parent more immediately connected with those relatives, and which, now again introduced, calls into action modifications of form and function which in that parent were at least rendered subordinate, and consequently obscure, by other and more dominating ones. As to the tendency among domesticated animals, mentioned by Mr. Blaine, it is a mere re-formation of the original breeds by man without his being aware of it, as has been already explained; and it is very natural that it should be least observed in breeds which are likest the original.

“The ancients,” says Camper, “thought that the child was susceptible, solely through the effects of the mother’s imagination, of acquiring a likeness to a particular individual at the very moment of conception, although they were not otherwise ignorant of the fact, that fecundation takes place unknown to the parents. The moderns have carried this power of the imagination still further: they have maintained, even obstinately, that the child already conceived may be injured or modified by the mother’s imagination, even up to the moment of the birth.” . . .  
 “The human race,” adds Camper, “would indeed be much to be pitied, if the fate of children depended on the foolish, depraved, and frequently insane imagination of the father or mother.”

For the likeness of a child to one who should not have been the father, it would be very fair to admit the reason, that the mother’s imagination was occupied with him at the moment of conception, though

it might be ridiculous enough to regard that as a sufficient excuse for the resemblance. But as to the modern notion of the influence of imagination, it is not so destitute of foundation as Camper supposes.

Roussel remarks, that "children have been subject all their lives to convulsions, in consequence of their mothers having been, during pregnancy, struck with terror or some other powerful emotion. Haller, indeed, observed that, from the want of nerves to establish a communication between the mother and the foetus,—nerves which are the only means by which the movements of the mind can be transmitted, the mother cannot cause the infant to experience the impressions which she feels. But if, by his own acknowledgment, a mother may communicate to her infant the convulsions into which extreme terror has thrown her, it is evident that the mother may communicate her affections to the foetus without the intermediate assistance of nerves."

Some remarkable instances of the influence of maternal imagination have been observed among female quadrupeds.

An Arabian mare, belonging to the Earl of Morton, which had never been bred from before, after having a mule by a quagga, had, in succession, three foals by a black Arabian horse. The first two of these are described as follows.—They have the character of the Arabian breed as decidedly as can be expected; but, both in their colour, and in the hair of their manes, they have a striking resemblance to the quagga. Their colour is bay, marked more or less like the quagga in a darker tint; and both are distinguished

by the dark line along the ridge of the back, the dark stripes across the forehead, and the dark bars across the back part of the legs. Both their manes are black : that of the filly is short, stiff, and stands upright ; that of the colt is long, but so stiff as to arch upwards, and to hang clear of the sides of the neck, in which it resembles the hybrid : this is the more remarkable, as the manes of the Arabian breed hang lank, and closer to the neck, than those of most others.

The explanation of these phenomena by Mr. Mayo is, that the connexion with the male produces a physical impression, not merely upon the ova, which are ripe for impregnation, but upon others likewise, that are at the time immature. As, however, there are ample proofs of the power of the mother's imagination among quadrupeds, especially over colour, this explanation is very improbable.

"Some physiologists," says Mr. Knight (4, December,) "have been disposed to think, that the imagination of parents operates upon the character of the offspring. The strange fact of Lord Morton's mares having continued to produce, in a declining extent, striped horses, is perhaps, to some extent, favourable to such opinions."

In the Quarterly Journal of Agriculture, Mr. Boswell says, "One of the most intelligent breeders I ever met with in Scotland, Mr. Mustard, of Angus, told me that one of his cows chanced to come in season, while pasturing on a field, which was bounded by that of one of his neighbours, out of which an ox jumped, and went with the cow, until she was brought home to the bull. The ox was white, with black

spots, and horned. Mr. Mustard had not a horned beast in his possession, nor one with any white on it. Nevertheless, the produce of the following spring was a black and white calf with horns."

Mr. Blaine says that, "Imprintings which have been received by the mother's mind previous to reproduction, are conveyed to the germs within her, so as to stamp one or more of them with characteristic traits of resemblance to the dog from which the impression was taken, although of a totally different breed from the real father of the progeny. In these instances of sympathetic deviation, the form, size and character are, in most, principally the mother's; but the colour is usually the favourite's, with, perhaps, a few characteristic blendings of external resemblance intermixed.

"It would appear that this mental impression, which is perhaps usually raised at some period of œstrum, always recurs at that period, and is so interwoven with the organization even, as to become a stamp or mould for some if not all of her future progeny; and the existence of this curious anomaly in the productive system is confirmed by acts of not unfrequent occurrence.

"I had a pug bitch whose constant companion was a small and almost white spaniel dog of Lord Rivers' breed, of which she was very fond. When it became necessary to separate her, on account of her œstrum, from this dog, and to confine her with one of her own kind, she pined excessively; and notwithstanding her situation, it was sometime before she would admit of the attentions of the pug dog placed with her. At



length, however, she did so; impregnation followed; and, at the usual period, she brought forth five pug puppies, one of which was elegantly white, and more slender than the others.—The spaniel was soon afterwards given away, but the impression remained; for, at two subsequent litters (which were all she afterwards had,) she presented me with a white young one, which the fanciers know to be a very rare occurrence.

“The late Dr. Hugh Smith used to relate a similar instance which occurred to a favourite female setter that often followed his carriage. On one occasion, when travelling in the country, she became suddenly so enamoured of a mongrel that followed her, that, to separate them, he was forced, or rather his anger irritated him, to shoot the mongrel, and he then proceeded on his journey. The image of this sudden favourite, however, still haunted the bitch, and for some weeks after, she pined excessively, and obstinately refused intimacy with any other dog. At length, she accepted a well-bred setter; but when she whelped, the Doctor was mortified with the sight of a litter which, he perceived, bore evident marks, particularly in colour, of the favoured cur, and they were accordingly destroyed. The same also occurred in all her future litters: invariably, the breed was tainted by the lasting impression made by the mongrel.”

In the Transactions of the Linnæan Society of London, is an account, by Mr. Milne, of a pregnant cat, his own property, the end of whose tail was trodden on with so much violence, as to give the animal intense pain. When she kittened, five young ones appeared, perfect in every other respect except the tail, which



was, in each of them, distorted near the end, and enlarged into a cartilaginous knob.

Of the influence of climate, Sir Anthony Carlisle says, (16, August,) "It has been for some time notorious, and I think recorded in the larger volumes descriptive of the convict colony of Botany Bay, that the children of European parents there are generally born with white hair and fair complexions. Inquiries made by myself assure me, that the children of European descent in the second generation, are almost universally fair and white haired, notwithstanding the colour and complexion of their parents. This was confirmed by a surgeon who was lately examined at the college, and who had resided seven years at Sidney Town as a medical man.

"The same gentleman stated that the second generation of European descent at Botany Bay, partook of the ugly visages of the aboriginal inhabitants.—I rather suspect that the present descendants of the older North American settlers, begin to resemble in figure the original Indians."

That the long cohabitation and intimacy of two individuals, induces similarity of countenance, I have often observed. It is to be seen chiefly in old married couples, in the most moveable features of the face, and principally about the mouth. It is doubtless the result of sympathetic feeling and similar expression.

Dr. Hancock, the American traveller (15, August,) says, "It has appeared to me that very obvious changes are produced in a few generations, from certain assimilations independently of intermarriage. We find, in negro families which have long dwelt

with those of the whites as domestics, that successive generations become less marked in their African features, in the thick lip and flat nose ; and, with skins of a shining black, they gradually acquire the European physiognomy. This is more especially observable amongst the older settlers, and in the smaller islands, such as St. Kitts, Nevis, Montserrat—where there had been but small accessions of native Africans.

“Under such circumstances, we may often distinguish a Dutch negro by the countenance alone. This difference can scarcely be described by words, but frequently we observe that obliquity of the eye so common to the Hollander.—I have never read or heard of any discussion on this subject ; but I have long thought it curious and deserving the consideration of anthropologists. I cannot pretend to account for this, and I merely state the facts, which I doubt not you will find confirmed by those who have enjoyed similar opportunities of observation.”

On the influence of domestication, Mr. Lawrence, in his Lectures, says, “In endeavouring to account for the diversities of features, proportions, general form, stature, and other particulars, I must repeat an observation already made and exemplified in speaking of colour : namely, that the law of resemblance between parents and offspring, which preserves species, and maintains uniformity in the living part of creation, suffers occasional and rare exceptions ; that, under certain circumstances, an offspring is produced with new properties, different from those of the progenitors ; and that the most powerful of these causes

is that artificial mode of life which we call the state of domestication.

“At present, we can only note the fact, that the domestic condition produces, in great abundance, not only those deviations from the natural state of the organization, which constitute disease, but also those departures from the ordinary course of the generative functions, which lead to the production of new characters in the offspring, and thus lay the foundation of new breeds. The domestic sow produces young twice a year; the wild animal, only once. The former frequently brings forth monstrous fœtuses, which are unknown in the latter.”

In a philosophical point of view, Mr. Blaine observes, “We have no such thing as a pure breed among any of our domestic animals. Our most boasted specimens are either altogether degenerated, or produced from congenital varieties: the native and original types are mostly unknown to us.

“In tracing the natural history of the dog, we must feel convinced, that what we call breeds are but varieties, which have been generated by various causes, as climate, peculiarity in food, restraint and domestication. Man, active in promoting his own benefit, has watched these gradual alterations, and has improved and extended them by aiding the causes that tend to their production, and by future care has perpetuated and made them permanently his own.

“Many varieties among dogs and other domestic animals are the effect of monstrosity, or have arisen from some anomaly in the reproductive or breeding process. When these accidental varieties have exhib-

ited a peculiar organization or form which could be applied to any useful or novel purpose, the objects have been reared, and afterwards bred from; and when the singularity has been observed in more than one of the same birth, it has been easy to perpetuate it by breeding again from these congeners, and confining the future intercourse to them.

“To these accidental variations from general form and character among dogs, we are to attribute our most diminutive breeds, our pugs, bull-dogs, wry-legged terriers, and some others; our general breeds are, however, rather the effect of slow cultivation than of sudden and extraordinary production.”

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### SECTION III.

#### CONSEQUENT EASY IMPROVEMENT OF FAMILIES.

I have already shown that organization is nearly indestructible, because, although the two series of organs in parents may be dislocated in progeny, they still exist, and enter into new combinations, or are reformed. I have also shown that perfection is unattainable by any race, because, long ere it could be reached, parents would resemble each other, sexual excitement would cease, and reproduction would fail.

The first of these facts presents the great obstacle to the general and speedy improvement of the human race. The second proves that no advantages, limited even to privileged families, and enjoyed by them in the highest degree, would exempt them from the im-



perfection and the ills, which are in reality essential to all existence.

Neither of these facts, however, can in any degree discourage either nations or families in the career of improvement, from the highest degree of which all are so vastly remote.

In relation to the first of these facts, I have said that organization is nearly indestructible, because it cannot be doubted that education, though far more slowly than zealous persons imagine, yet if general—an important condition—would slowly ameliorate it. And this is one source of hope for humanity.

Even without that systematic and universal education, which any enlightened government would establish, we see what the education derived, amidst frightful hazards and infinite suffering, from the mere accidents of life, can accomplish.

The poor man, born with happy organization, and reared in the stern school of misfortune, often becomes superior to the aristocracy of the land, who, in the destitution of talent inseparable from their education, are compelled to court his aid, especially when that can render them more secure in rank, and richer in emolument.

Certain it is that families, by intermarriages founded on rational principles, and in conformity with the natural laws so clearly established, as prevailing equally among men and lower animals, may, surely, easily and quickly (some in their first, others in their second generation) raise themselves, in some at least of their members, from deformity to beautiful organi-



zation, from disease to health, and from stupidity to high mental ability.

Moreover, if the importance of judicious crossing were seen, among the variously organized tribes composing a nation like the British, these benefits, in moderate degree, would be proportionally extended among the mass of the people.

In the subsequent part of the work, devoted to the subject of Choice, the application of these principles, in its most essential details, will be made to all the great individual varieties.

It is here only meant to be shown that, on these principles, the means of improvement are in the power of every family.

A little reflection on the laws of descent will show, that a son can resemble his father only in half his organization. It similarly follows, that on this son intermarrying, he may not communicate to the grandson the share which he has in his father's, but that which he has in his mother's, conformation.

Thus one-half the father's organization *must* be lost in the son, accident at present alone determining whether it shall be the best or the worst portion; and the other half *may* disappear in the grandson so that the latter shall not have the slightest degree of the organization, nor the slightest reesemblance to his grandfather. Hence it follows, that a man may have no rational interest, physical or moral, in his second or third generation.

On how slender a basis, then, are at present founded the claims of hereditary descent—the certainty that the son must have a very partial resemblance to

the father—that the grandson may have none—and that there are many chances against subsequent generations having the slightest!

Similar reflections, however, on these laws will show, that, by placing himself in suitable relation to an appropriate partner in intermarriage, man, unless all the most undisputed *facts* of breeding be *false*, has (precisely as the breeder has among lower animals) the power to reproduce and to preserve either series of organs—the best, instead of the worst, portion of his organization.

It can, indeed, be only passion, venality or pride, that can prevent man from doing, for his own progeny, that which natural and universal laws permit him to do for the progeny of every domesticated animal. The only reply that, under these circumstances of actual and daily demonstration, he can make to the invitation of nature and science, is, that he prefers a blind passion to an enlightened one,—brutal indulgence, succeeded by life-long disgust, to exquisite enjoyment and permanent happiness,—or money, a mere means of pleasure, at the cost of domestic misery—perhaps of conjugal or filial insanity, to actual pleasure for himself and all around him, as well as the progress of children in intellectual improvement and honourable arts—the sole means of abiding fortune,—or rank from which he may look up to those above, who despise and spit upon him because he would vainly overtake them in their idiot scramble for a bubble, and down on those below, who therefore naturally hate him for his insolent assumption.

To those of higher aspirations than these—to those

who seek for the improvement of their race, and for the mental advancement both in themselves and their progeny, it cannot be wrong, in passing, to say that the other functions will diminish in energy as the cerebral functions become more intense. Hence men of the highest intelligence are more liable than others to cerebral affections. There are, therefore, prudent limits even to the best employment of the mind.

But not only is the means of improved general organization in progeny subject, by intermarriage, to the control of man, beauty of face is, by the same means, equally in his power.

An equality or similar proportion between the organs combined in children, is always productive of more or less beauty, whatever the size of these organs may be. On the contrary, an inequality or disproportion between the combined organs, is always productive of ugliness.

Accordingly, where there is a symmetry of head, there is symmetry of face, or beauty; and where there is want of symmetry of head, there is want of symmetry of face, or ugliness. A perfect correspondence must indeed exist in this respect.

The reason is obvious. The backhead being the originator of all voluntary motions—those of the moveable parts of the face as well as others, they go together, and the agreement or disagreement of these parts becomes striking.

The greatest degrees of ugliness occur in the lower half of the face. I may, therefore, take thence my examples.

A prominent backhead added to a smaller forehead,

always produces a disagreeable projection of the lower parts of the face—generally of the underlip and lower part of the nose. The Ethiopic negro, with a large backhead, has prominent alveoli and lips.

On the contrary, a small backhead added to a very large forehead, always produces a not less disagreeable contraction of the lower part of the face.

Beautiful parents produce ugly children, when the organs in the new combinations are worse adapted to each other than the old ones. Ugly parents produce beautiful children, when the organs are better adapted to each other than the old ones.

Thus the mere relative proportion of the organs combined in children is a great cause of beauty or of ugliness; and there are no exceptions to its influence.

As already said, however, this is not the place for details.